

KITOI BAY HATCHERY ANNUAL MANAGEMENT PLAN, 2004



By

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and
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EXECUTIVE SUMMARY

New Projects for 2004: None

Cost Recovery: Conduct second cost recovery fishery since 1989, with similar objectives as in 2003.

Salmon Adult Returns, Stocking, and Egg Take Goals (2005 Stocking Goals), 2004 (rounded to thousands):

Stocking Location (Broodstock)	2004 Projected Enhanced Return	2004 Stocking Plan	Goals		
			2004 Eggs	2005 Stocking	Lifestage
Kitot Bay pink (BKC)	7,900,000	145,000,000 ^a	190,000,000	139,000,000	fry
Kitot Bay chum (BKC)	423,000	21,000,000 ^a	25,000,000	21,000,000	fry
Kitot Bay coho (BKC)	165,000	965,000 ^b	1,200,000	1,000,000 ^a	smolt
Jennifer Lake coho (BKC)	2,000	200,000 ^a	273,000	200,000	fingerling
Ruth Lake coho (BKC)	0	30,000 ^a	55,000	30,000	fingerling
Total coho return to					
Kitot Bay area	167,000				
Crescent Lake coho (BKC)	3,000	165,000 ^a	548,000	165,000	fingerling
Katmai Lake coho (BKC)	1,000	15,000 ^a	36,000	15,000	presmolt
Little Kitot Lake sockeye (SL)	9,000	190,000 ^b	807,000	400,000 ^c	presmolt

Broodstocks: BKC - Big Kitot Creek (Kitot Bay Hatchery); SL - Sallery Lake

^a Brood Year 2003

^b Brood Year 2002

^c 300,000 Brood Year 2003 and 100,000 Brood Year 2004

ABSTRACT

The Kitoi Bay Hatchery (KBH) is located on Afognak Island about 30 air miles north of the city of Kodiak and is financed and operated by the Kodiak Regional Aquaculture Association. The hatchery has the capacity to incubate 244 million salmon eggs and rear up to 180 million juveniles of all life stages. Currently, KBH incubates and rears a single stock of each of the following salmon species: pink *Oncorhynchus gorbuscha*, chum *O. keta*, coho *O. kisutch*, and sockeye *O. nerka* salmon. This management plan describes: 1) projected releases of juvenile salmon in 2004, 2) egg takes in 2004 and projected releases in 2005 and 2006, 3) salmon harvest management in 2004, 4) additional measures for wildstock protection in 2004, and 5) evaluation plans for 2004.

Approximately 145,000,000 pink salmon fry (Big Kitoi Creek stock) will be released in 2004. The 2004 adult return from 2003 fry releases into Kitoi Bay is expected to be about 7,900,000 pink salmon, of which over 7,500,000 will be available for harvest. About 350,000 adult broodstock will be used in 2004. Hatchery personnel will collect 190,000,000 pink salmon eggs in 2004, which will result in approximately 139,000,000 fry for release from the hatchery in 2005.

Kitoi Bay Hatchery plans to release 21,000,000 chum salmon fry (Big Kitoi Creek stock) into Kitoi Bay in 2004. Prior fry releases are expected to produce a return of about 423,000 adult chum salmon in 2004. About 30,000 adult chum salmon will be collected for broodstock in 2004. These fish will provide 25,000,000 eggs for a chum salmon release of 21,000,000 in 2005.

About 965,000 coho salmon smolts (brood year 2002 Big Kitoi Creek stock) will be released into Big Kitoi Bay in 2004. A total of approximately 395,000 fingerlings will be released into Jennifer, Ruth, and Crescent Lakes and 15,000 presmolts will be released into Katmai Lake in 2004. Prior releases of juvenile coho salmon are expected to produce a return of about 171,000 adults in 2004. About 2,100,000 eggs will be collected in 2004, which are expected to produce about 395,000 fingerlings and 15,000 presmolts for release in 2005 and 1,000,000 coho salmon smolts for release in 2006.

In 2004 approximately 190,000 sockeye salmon presmolts (brood year 2002 SALTERY Lake stock) will be imprinted in net pens in Little Kitoi Lake (LKL) prior to non-volitional release into Little Kitoi Bay. Due to a surplus of brood year 2003 SALTERY Lake alevin at Pillar Creek Hatchery, about 110,000 sockeye salmon will be released into LKL as summer and fall presmolts (Honold and Byrne *in press*). The 300,000 SALTERY Lake alevin (brood year 2003) currently at Kitoi Bay Hatchery will be imprinted in net pens in LKL prior non-volitional release into Little Kitoi Bay in the spring of 2005. Prior releases of this stock are expected to produce a return, in 2004, of about 9,000 adult sockeye salmon. Egg takes in 2004 will require about 807,000 eggs for future sockeye salmon releases (100,000 fall release in 2005 and 400,000 spring smolt into net pens in LKL in the spring of 2006).

A cost recovery fishery, similar to the 2003 fishery (revenue goal of \$500,000), will be executed at Kitoi Bay in 2004. The fishery will again target primarily pink salmon, but some chum and coho salmon will likely be caught incidentally.

INTRODUCTION

Kitoy Bay Hatchery (KBH) is located on Afognak Island (58°11.04' N lat., 152°21.04' W long.) on the west side of Izhut Bay approximately 48 km (30 air miles) north of the city of Kodiak (Figure 1). The facility was constructed in 1954 by the United States Department of the Interior, Fish and Wildlife Service, but was destroyed in the 1964 earthquake and then rebuilt by the Alaska Department of Fish and Game (ADF&G) in 1965. The hatchery was initially designed as a sockeye salmon *Oncorhynchus nerka* research facility; in 1976 the emphasis switched to pink salmon *O. gorbuscha* production. The present goal of the facility is to provide enhanced salmon fishing opportunities for the Kodiak common property fisheries by increasing the returns of sockeye, coho *O. kisutch*, pink, and chum *O. keta* salmon primarily to the Kitoy Bay area (Figures 2 and 3). KBH was designed to increase salmon production for Kodiak Island commercial seine and set gillnet fisheries. Secondary user groups (in terms of the number of salmon harvested) that benefit from the hatchery production include subsistence and recreational fishers. KBH has the capacity to incubate 244 million salmon eggs and rear up to 180 million juveniles of all life stages (fry, fingerling, presmolt, and smolt). Funding for the hatchery was provided exclusively by ADF&G prior to fiscal year (FY) 1987, and was provided jointly by ADF&G and Kodiak Regional Aquaculture Association (KRAA) from FYs 1987-1991. The hatchery has been fully funded by KRAA since FY 1992.

KBH is primarily a site-specific production facility where the majority of eggs are collected and incubated on-site and resultant juveniles of all lifestages are reared and released from the hatchery. The majority of the returning adults are caught by Kodiak's commercial salmon net fishers in the Duck, Izhut, and Inner and Outer Kitoy Bay Sections of the Afognak District (Figures 2 and 3).

Big Kitoy Lake (BKL) supplies KBH with water through two 35.6-cm (14-inch) diameter pipelines (Figure 4). There are two deep pipelines extending 457 m (500 yards) and 732 m (800 yards) into BKL drawing water from depths of 15.2 m (50 feet) and 22.9 m (75 feet), respectively. These deep pipelines join just downstream of the dam and supply one pipeline extending to the hatchery with water ranging from 3.0 to 6.0°C. The shallow pipeline draws water from a depth of 5 feet, supplying water with temperatures ranging from 0.5° to 16°C. These pipelines connect to a manifold allowing the hatchery to control water temperatures in any part of the hatchery. Excess lake water drains from BKL through Big Kitoy Creek (BKC; Figure 4). BKC contains a barrier falls approximately 503 m (550 yards) upstream from salt water and 183 m (200 yards) downstream from BKL that prevents adult salmon from entering the lake. A weir is installed at the mouth of the creek and adjacent to KBH to facilitate pink salmon egg takes. Coho and chum salmon ascend a fish ladder at the weir and enter two raceways adjacent to the hatchery facility where they are utilized for egg takes.

Little Kitoy Lake (LKL) is located approximately 0.40 km (0.25 miles) north of KBH (Figure 4). LKL drains through concrete raceways and a fish pass (Alaskan Steeppass type) system located at the lake outlet. All returning adults must pass through this system before entering the lake. The raceways are designed to control movement of both returning adults and outmigrating smolts, enabling the single system to monitor escapement and outmigration simultaneously.

Smolts outmigrate through the raceways into a pipeline bypass adjacent to the adult fish pass. The fish pass and outmigration pipeline drain directly into Little Kitoi Bay.

The development of a pink salmon brood source began at the hatchery in 1976 using donor stock from a small run to BKC (Honnold and Aro 2003). Pink salmon are the only salmon species indigenous to BKC. The program expanded from an egg collection of approximately five million eggs in 1976 to 215 million eggs in 1989. Recent increases in green-egg to eyed-egg survival has lowered the pink salmon egg take requirement to a range of about 180 to 190 million eggs. All pink salmon eggs are collected from broodstock returning to BKC and are incubated at KBH. The resultant fry are reared in saltwater net pens adjacent to the hatchery for a period of three to eight weeks prior to release into Big Kitoi Bay.

A chum salmon broodstock program using Sturgeon River stock was initiated in 1980 (Honnold and Aro 2003). The first chum salmon egg take occurred at the hatchery in 1986. Thereafter, runs have been adequate to collect broodstock, but the hatchery production goal of 25 million eggs (a 22 million fry release) was not consistently achieved until recent years (1999-2003). In 1991 (brood year 1990) an infectious hematopoietic necrosis virus (IHNV) outbreak resulted in a complete brood year failure. After the IHNV outbreak, ultraviolet (UV) light water disinfecting units were installed in the hatchery to sterilize all incubation water in an effort to prevent further disease outbreaks. The UV water treatment has been successful; no outbreaks of IHNV have occurred since it was installed. Chum salmon fry produced at the hatchery are reared in saltwater net pens adjacent to the hatchery for a period of four to ten weeks prior to release into Big Kitoi Bay.

A coho salmon stocking project using Buskin Lake and LKL wild stocks was started at KBH in 1982 (Honnold and Aro 2003). The fry were released into a number Kodiak road system lakes and a portion were stocked into Buskin (Buskin Lake broodstock) and Little Kitoi Lakes (LKL broodstock). In 1990 coho salmon fingerlings were released into Kitoi Bay (wild LKL stock) to develop a hatchery broodstock returning to BKC and to increase the commercial harvest in the Kitoi Bay area. Since 1993 coho salmon runs have been adequate for hatchery egg takes and have provided enough eggs to reach production goals (about 2.0 million). The majority of juvenile coho are released from the hatchery into Big Kitoi Bay at the smolt life stage; however, some juveniles are released as fingerlings into local lakes in the Kitoi Bay area (Jennifer and Ruth Lakes; Figure 4). Coho salmon fingerlings are also stocked into Crescent Lake (adjacent to Port Lions; Figure 5) and presmolts are stocked into Katmai Lake (adjacent to Ouzinkie village; Figure 1). These projects have created coho salmon subsistence fisheries for the villages of Port Lions and Ouzinkie. In addition, local school students assist with the stocking of Katmai Lake as part of their school curriculum.

KBH collected eggs from an age 0. component of the late-run Upper Station Lake sockeye salmon stock from 1988 through 1994 to develop a late-run sockeye salmon broodstock that would return to LKL (Figure 1; Hall et al. 1997; Honnold and Aro 2003). The age 0. fish spend only a few weeks rearing in Upper Station Lake (lower Olga Lake) before outmigrating to the ocean; thus, adults return sooner than those fish that rear for the typical 1-2 years in freshwater. Eggs from the age 0. sockeye salmon were incubated at KBH, reared in freshwater in raceways at the hatchery for about two weeks, and then transferred to net pens in Little Kitoi Bay. The

net pens were protected from the open ocean by oil booms, which also slowed the flow of freshwater leaving LKL and provided a freshwater layer in the pens. This freshwater “lens” decreased the salinity in the net pens, allowing the age 0. smolts to acclimate to saltwater and imprint on LKL. Smolts were released after about a week of rearing in the net pens. The intent of this project was create a return of sockeye salmon to LKL which could be used as an egg source for Pillar Creek Hatchery (PCH) with resultant fry stocked into Spiridon Lake (Figure 1). Due to unsatisfactory survival from the age 0. releases, the project was modified in 1993 to include the stocking of age 0. presmolts (late fall releases) into LKL and age 1. smolts (late spring releases) into Little Kitoi Bay.

Previously, the stocking of LKL had been avoided because of large volumes of hydrogen sulfide existing at lower depths in the lake. This layer was the result of saltwater intrusion during the 1964 earthquake (Schrof et al. 2000). The layer acts like a “nutrient sink,” reducing the ability of the lake to support zooplankton, which is the primary food source for juvenile sockeye salmon. In 1995 an 8-inch pipeline was sunk into the lake and most of the hydrogen sulfide was siphoned off. Although a small amount of hydrogen sulfide remained, the zooplankton levels immediately showed signs of improvement.

The enhancement strategies initially used to develop a LKL sockeye salmon run relied on the late-run Upper Station stock as a brood source; however, research by ADF&G concluded that Saltery Lake sockeye salmon, as opposed to late-run Upper Station sockeye salmon, was preferred for Spiridon Lake and LKL stocking (Clevenger et al. 1997; Honnold 1997). The earlier run timing of Saltery Lake sockeye salmon (about three weeks earlier than the late-run Upper Station sockeye stock) was expected to improve returns to Little Kitoi Lake and make broodstock collection easier. Additionally, the earlier run timing was expected to reduce the incidental harvest of Spiridon River pink and chum salmon stocks during the terminal fishery targeting returns to Spiridon Lake. Therefore, in 1997 Saltery Lake sockeye salmon were used for the LKL broodstock development program. Brood year (BY) 1997 smolts were released into LKL in the spring of 1999 with the expectation that they would outmigrate from the lake that year. About half of the expected number of smolts left the lake in 1999, indicating either poor survival or hold-over in the lake (Schrof and Honnold 2003).

The low smolt outmigration led to an experiment where half of the BY 1998 sockeye salmon were released in the fall (presmolts) of 1999 and the other half in the spring (smolts) of 2000 (Hall et al. 1998). These releases were differentially fin clipped to determine their survival rates and emigration timing. Results from the fin clipping studies suggested that the fall releases were the most successful, in terms of the number of smolts outmigrating from LKL (McCullough and Aro 2002). Juvenile sockeye salmon typically outmigrate from lakes after one year of rearing; however, poor rearing conditions (i.e., low zooplankton levels) prevent juvenile sockeye salmon from achieving the optimal size to tolerate saltwater, which results in fish remaining in lakes one or two additional years to acquire the necessary growth (Barnaby 1944; Krokhin 1957; Burgner 1964; Foerster 1968; Koenings et al. 1993). Thus, nutrients were added to LKL during 2000-2001 to improve zooplankton productivity (Schrof and Honnold 2003). In addition, fall presmolt releases were considered the best release strategy to lessen the impacts to the zooplankton community. These fish do not actively feed during the winter and based on the fin clipping results, we expected most presmolts to outmigrate the following

spring prior to the zooplankton blooms in the lake. Presmolt stocking continued from 2000 through 2003 and appeared to reduce the incidence of smolts holding in LKL an extra year. Unfortunately, the fertilization program was discontinued after 2001 due to budget constraints and recent limnological data suggest that LKL continues to be a marginal environment for successfully rearing sockeye salmon (Schrof and Honnold 2003). These data indicate inadequate zooplankton production and a reduced capacity for the lake to support juvenile sockeye salmon releases. Consequently, releases have been reduced to match the theoretical carrying capacity of the LKL lake, which has reduced the number of outmigrating smolts.

In 2003, the broodstock development program was modified in response to the low number of outmigrants and poor zooplankton levels in LKL (Honnold and Aro 2003). A modest number (100,000) of presmolts were released (Saltery Lake broodstock) into LKL in the fall as in the previous years, but a portion of the BY 02 juveniles were reared at KBH through the winter of 2003/2004. These fish (about 200,000) will be transferred into net pens in LKL in late April or early May 2004 for short-term rearing and imprinting and will be non-volitionally released in mid to late May. The smolts will be transferred by pump from net pens to concrete raceways located at the outlet of LKL when the majority of the resident smolts are outmigrating from the lake. The flow of water from LKL through the raceways will move the smolts into a pipeline draining into Little Kitoi Bay. If needed, smolts will be pumped from the raceways directly into Little Kitoi Bay. This rearing and release strategy is intended to produce approximately 260,000 Saltery Lake stock smolts, which should provide adequate numbers of returning adults to satisfy the broodstock development goal.

This management plan describes: 1) projected releases of juvenile salmon in 2004, 2) egg takes in 2004 and projected releases in 2005 and 2006, 3) salmon (enhanced stocks) harvest management in 2004, 4) additional measures for wildstock protection in 2004, and 5) evaluation plans for 2004. Appendices A-E describe historical juvenile salmon releases from KBH, by species. Inseason assessments and project approvals by the KRAA, the ADF&G, or the FWS may result in changes to this management plan in order to reach or maintain program objectives.

RELEASES IN 2004

Pink Salmon: Big Kitoi Creek Stock

In 2004 KBH will rear and release 145,000,000 0.65-g pink salmon fry (Table 1). The fry will be volitionally released from the hatchery into saltwater net pens via pipelines, reared in saltwater for a period of three to eight weeks, and then released into Big Kitoi Bay (Figures 3 and 4).

About 7,903,000 adult pink salmon are expected to return to KBH in 2005 from this release based on a stocking-to-adult survival of 5.45% (Tables 1 and 2). The pink salmon run should begin in late July, peak in early August and end in late August (Figure 6). Most pink salmon

returning to KBH will be harvested in the commercial salmon fishery in Izhut, Duck, and Kitoi Bay Sections (Figure 3).

Chum Salmon: Big Kitoi Creek Stock

In 2004 we plan to rear and release 21,000,000 1.75-g chum salmon fry directly into Big Kitoi Bay (Table 1; Figures 3 and 4). The fry will be volitionally released from the hatchery via pipelines into saltwater net pens and reared for a period of four to 12 weeks.

Applying a 1.95% stocking-to-adult survival, results in approximately 410,000 adults returning from the 2004 release beginning in 2006 and continuing through 2008 (Tables 1 and 2). Over 300,000 age 0.3 chum salmon (three years ocean residence) are expected to return in 2007. Chum salmon runs into Kitoi Bay usually begin in early June, peak in mid June to early July and end in early August (Figure 6). Most chum salmon returning to KBH will be harvested in the commercial salmon fishery in the Duck, Izhut, and Kitoi Bay Sections (Figure 3).

Coho Salmon: Big Kitoi Creek Stock

In 2004 we plan to release 965,000 20.0-g age 1. coho salmon smolts (BY 02, BKC broodstock) into Big Kitoi Bay (Table 1; Figures 3 and 4). Initial imprinting will occur prior to transfer into saltwater, while smolt are still in the hatchery freshwater raceways. The smolts will be transferred from the hatchery via pipelines into saltwater net pens and reared for about four weeks to provide additional time for imprinting and adjusting to ocean salinity (osmoregulation). The saltwater net pens will be located in the vicinity of the BKC discharge (KBH water source), which is intended to provide further imprinting opportunities.

The average stocking-to-adult survival (over 15%) of smolts released from the hatchery has been extremely consistent and we expect approximately 169,000 adults to return in 2005 as age 1.1 coho salmon (Tables 1 and 2).

In 2004 we also plan releases (BY 03 BKC broodstock) in the Kitoi Bay area of 200,000 0.70-g coho fingerlings into Lower Jennifer Lake and 30,000 0.70-g coho fingerlings into Ruth Lake (Table 3; Figure 4). About 2% of these releases, 4,000 adults to Jennifer Lake and 600 adults to Ruth Lake, are expected to return in 2007 (Tables 2 and 3). Stream barriers (waterfalls) near tide water prevent adult salmon from entering either Jennifer or Ruth Lakes; therefore, all returning fish will be available for harvest.

Coho salmon runs into Kitoi Bay usually begin in early August, peak in mid to late August and end in early September (Figure 6). Most coho salmon returning to KBH should be harvested in the commercial salmon fishery in the Duck, Izhut, and Kitoi Bay Sections (Figure 3).

In 2004 we also plan remote releases (BY 03 BKC broodstock) of 165,000 0.70-g coho fingerlings into Crescent Lake (Port Lions village area; Figure 5) and 15,000 7.5-g coho presmolt into Katmai Lake (Ouzinkie village; Table 3; Figure 1).

Adult returns from these releases are projected to be 3,300 to Crescent Lake in 2007 and 750 to Katmai Lake in 2006 (Tables 2 and 3). The residents of each neighboring village primarily harvest these salmon during sport and subsistence fisheries. A portion of the Crescent Lake run may be available for commercial harvest in the Northwest Kodiak District (Figure 2) and the Crescent Lake Terminal Harvest Area (Figure 5; 5 AAC 18.364).

The coho salmon stocking capacity of Ruth, Jennifer, Crescent, and Katmai Lakes is based upon the surface area of each lake. Release numbers are adjusted, if needed, in response to zooplankton biomass trends at each lake. All juvenile coho salmon stocked into lakes are transported to each site by floatplane using transfer tanks. The Katmai Lake release requires additional transport by four-wheelers equipped with small transfer tanks.

Sockeye Salmon: Sallery Lake Stock

In May 2004 we plan to release 190,000 BY 2002 sockeye salmon presmolts into LKL (Table 4). Originally, we planned to also stock BY 2003 presmolts into LKL in October 2004; however, instead of releasing presmolts from KBH, Pillar Creek Hatchery will release 110,000 presmolts (BY 2003) into LKL (Honnold and Byrne *in press*). KBH will defer fall stocking and rear the current inventory of BY 2003 sockeye until the spring of 2005. The BY 2002 juveniles will be transported to LKL by transfer tank, pumped into net pens, short-term reared and imprinted and then pumped out of the nets. The non-volitional outmigration from the net pens will occur during the peak outmigration of the resident sockeye smolts.

Approximately 33,000 adults are expected to return during 2005-2007 from the BY 2002 release (Tables 2 and 4). The majority of the returns should occur in 2006 and 2007 with the initial run beginning in late June, peaking in mid to late July and ending in mid August (Figure 7; Honnold 1997). The run timing is earlier than the Upper Station sockeye salmon stock which should make broodstock collection easier since the Sallery Lake stock should return after the chum salmon fishery and prior to the peak of the pink salmon fishery. This return timing is expected to reduce the harvest of these fish in the common property fishery and increase escapement into LKL.

In summary, we propose releasing the following in 2004: 145,000,000 pink salmon fry (BY 2003), 21,000,000 chum salmon fry (BY 2003), 965,000 coho salmon smolts (BY 2002), 395,000 coho fingerlings (BY 2003), 15,000 coho presmolts (BY 2003), and 190,000 sockeye salmon presmolt (BY 2002; Tables 1, 3, and 4).

EGG TAKES IN 2004 AND RELEASES IN 2005 AND 2006

Pink Salmon: Big Kitoi Creek Stock

In 2004 we intend to use 350,000 adults returning to KBH for broodstock (Tables 5 and 6). Our goal is to collect 190,000,000 eggs in 2004 to provide for the release of 139,000,000 0.65-g pink salmon fry into Big Kitoi Bay in 2005. The actual number released may be less depending on how many chum salmon eggs are collected and the egg to fry survival of both species. If the maximum chum salmon egg take occurs and results in about 25,000,000 eyed-eggs, incubation space will not be available for a maximum pink salmon egg take.

Approximately 7,600,000 adult pink salmon are expected to return to KBH in 2006 (Tables 2 and 6). The pink salmon run is expected to begin in late July, peak in early August and end in mid to late August (Figure 6).

Chum Salmon: Big Kitoi Creek Stock

Approximately 30,000 chum salmon adults returning to KBH in 2004 will be used for broodstock to achieve an egg take goal of 25,000,000 eggs (Tables 5 and 6). We plan to release 21,000,000 2.25-g chum salmon fry into Big Kitoi Bay in 2005 using a non-volitional outmigration technique for the first time. Non-volitional outmigration is a common technique used throughout Alaska, primarily for chum salmon, but also used for pink salmon fry. The technique requires the use of a Nopad incubator, which is a stackable type of incubator that can be moved around to facilitate the technique. Yolk sacs of the fry are sampled prior to outmigration to determine the percentage yolk sac to body weight. When that ratio approaches 3 –5% of the fry's body weight, the fry are ready to go to saltwater. At this point the incubators are lifted with an electric forklift and brought to a tank, submerged and emptied of all fry and incubator substrate. The water in the tank upwells over a bar grate and into another tank. The fry fall through the grate and flow by gravity to saltwater net pens. The substrate is separated from the fry by the bar grates and is removed for cleaning.

Non-volitional outmigration will result in saltwater rearing beginning between the first and third week of March and will extend rearing time by several weeks. Extended rearing is expected to increase chum salmon fry size at release to 2.25 g. The marine survival of chum salmon fry of this size typically ranges from 3 to 7% (D. Reggieonni, Prince William Sound Aquaculture Association, Cordova, personal communication) compared to our present average of between 1 to 2.5% survival. Using an average of 4% stocking-to-adult return survival, we expect 840,000 adults to return from 2007-2009 (Tables 2 and 6). The majority of the return is expected in 2008 (age 0.3 chum salmon - three years ocean residence). The run is expected to begin in early June, peak in mid June to early July and end in mid to late July (Figure 6).

Coho Salmon: Big Kitoi Creek Stock

We plan to release 1,000,000 20.0-g smolts (BY 2003) into Big Kitoi Bay in 2005, which should result in 175,000 adults returning in 2006 (Tables 2 and 6). Egg takes in 2004 will require 7,000 adults (1,200,000 eggs) to provide for the release of 1,000,000 20.0-g smolts in 2006 (Table 6).

Coho salmon egg takes (936 broodstock; 328,000 eggs) are also planned in 2004 for stocking at Jennifer (200,000 0.70-g fingerlings and Ruth (30,000 0.70-g fingerlings) Lakes in 2005 (Table 7; Figure 4). These releases are expected to produce 4,600 adults returning in 2008 (Tables 2 and 7).

In 2004 coho salmon eggs (1,668 broodstock; 584,000 eggs) will also be collected for planned releases at Crescent (165,000 0.7-g fingerlings) and Katmai Lakes (15,000 7.5-g presmolts) in 2005 (Table 7; Figures 1 and 5). Approximately 3,300 adults should return in 2008 as a result of the Crescent Lake releases and 750 adults should return in 2007 as a result of the Katmai Lake releases (Tables 2 and 7).

Coho salmon runs should begin in early August, peak in mid to late August and end in early September (Figure 6). Most coho salmon returning to KBH and the Kitoi Bay area should be harvested in the commercial salmon fishery in the Duck, Izhut, and Kitoi Bay Sections (Figure 3). The residents of nearby villages primarily harvest salmon returning from the Crescent Lake (Port Lions village) and Katmai Lake (Ouzinkie village) stocking projects during sport and subsistence fisheries. A portion of the Crescent Lake run may be available for commercial harvest in the Northwest Kodiak District (Figure 2) and the Crescent Lake Terminal Harvest Area (Figure 5; 5 AAC 18.364).

Sockeye Salmon: Saltery Lake Stock

We expect to release 300,000 20-g presmolts (brood year 2003) into LKL in May 2005 (using net pens in LKL in a manner similar to the 2004 release), which should result in 52,500 adults returning from 2006-2008 (Tables 2 and 8). Sockeye salmon eggs (538 broodstock; 807,000 eggs) will be collected from Saltery Lake or returning adults to LKL in 2004 to provide for the release of 100,000 9.0-g presmolts in October 2005 and 400,000 20-g presmolts in May 2006 into LKL (Table 8). About 77,500 adults are expected to return from 2007-2010 from these two releases (Tables 2 and 8). The returning adults are expected to have similar run timing as Saltery Lake sockeye salmon with the initial run beginning in late June, peaking in mid to late July and ending in mid August (Figure 7; Honnold 1997).

In summary, our egg take goals in 2004 are: 190,000,000 pink salmon eggs (350,000 broodstock), 25,000,000 chum salmon eggs (30,000 broodstock), 2,100,000 coho salmon eggs (9,600 broodstock), and 806,000 sockeye salmon eggs (538 broodstock; Tables 5-8). We propose releasing 139,000,000 pink salmon fry (BY 2004), 21,000,000 chum salmon fry (BY 2004), 1,000,000 coho salmon smolts (BY 2003), 395,000 coho fingerlings (BY 2004), 15,000 coho presmolts (BY 2004), and 400,000 sockeye salmon presmolts (300,000 BY 2003 and

100,000 BY 2004) in 2005 (Tables 5-8). An additional 1,000,000 coho salmon smolts (BY 2004) and 400,000 sockeye salmon presmolts (BY 2004) will be released in 2006.

SALMON HARVEST MANAGEMENT

Adult Salmon Forecasts for 2004

Approximately 7,900,000 pink salmon, 423,000 chum salmon, and 167,000 coho salmon (includes 2,000 from Jennifer Lake stockings) are expected to return to Kitoi Bay in 2004 as a result of previous releases of juvenile salmon from KBH (Table 5). Of these returns, 7,500,000 pink salmon, 391,000 chum salmon, and 157,000 coho salmon will be available for harvest. About 9,000 sockeye salmon are forecast to return to LKL in 2004, of which the majority will be needed for broodstock (fish that enter LKL are difficult to collect (seining) for broodstock and usually only half are captured). Sockeye broodstock collection at LKL will depend upon the incidental harvest during directed fisheries on chum and pink salmon and the actual run strength. If the sockeye salmon run is less than forecast and/or the incidental harvest is larger than expected, preventing the appropriate escapement into LKL, then broodstock will be collected at Saltery Lake (Table 5).

Kitoi Bay

The Kitoi Bay harvest strategy, as described in the Eastside Afognak Management Plan (5 AAC 18.365), is designed to increase fishing opportunities for the commercial salmon net fishery in the Duck, Izhut, and Kitoi Bays Sections (Figure 3) while providing for adequate broodstock and escapement to KBH. Inseason management of KBH salmon runs is complicated because of overlapping run timing between species and the escapement priority given to broodstock (Figure 6; Table 5). Therefore, inseason adjustments to fishing periods in any or all management units may be necessary. These adjustments may occur more frequently in the Kitoi Bay Sections and less frequently in the Duck Bay Section. During the broodstock collection periods, the burden of achieving adequate broodstock escapement while maintaining high quality harvests on hatchery bound returns will be shared by the Kitoi Bay Hatchery Manager and the Kodiak Area Salmon Management Biologist.

Kitoi Bay Special Harvest Area (SHA) is defined as the Inner Kitoi Bay Section (“inside the jaws”; Brennan et al. 2002, 2003, 2004; Figure 4). Cost recovery fisheries occurred in the SHA in 1987, 1988, 1989, and 2003 and will continue in 2004. The Board of Directors of KRAA have determined that the corpus, which had sustained the organization since 1989, is not sufficient to continue the long-term operation of Kitoi Bay Hatchery. Thus, KRAA seeks to derive additional funds from cost recovery fisheries to supplement hatchery operations. Like the cost recovery in 2003, the revenue goal will be \$500,000 and the fishery will focus on pink salmon (Honnold and Aro 2003). Vessels will again be contracted to catch and deliver the fish to processors having bids approved by the Board of Directors. Contract vessels may use unrestricted purse seine gear in the SHA.

Pink Salmon

Pink salmon produced at KBH are harvested in commercial purse seine fisheries in the Duck, Izhut, and Kitoi Bays Sections (Figures 3 and 4). Natural stocks of pink salmon destined for the Westside of Kodiak Island and other Afognak Island systems may also contribute to the harvest. The pink salmon return begins in mid July, peaks in early to mid August, and ends in late August to early September (Figure 6). The initial fishery opening for pink salmon is expected in late July and is designed to harvest excess males, which arrive during the early portion of the run. Broodstock will be collected throughout the duration of the run once it is composed of at least 60% female fish. Spawning pairs will be randomly selected during the egg takes to maximize genetic variability. In order to harvest pink salmon in excess of the hatchery broodstock needs (350,000; Table 5), additional openings may occur.

Depending on run strength and timing, the Inner and Outer Kitoi, Izhut, and Duck Bay Sections may close to commercial salmon fishing from July 20 through September 5 to allow for pink salmon broodstock escapement and cost recovery fisheries (Figures 3 and 6). Most pink salmon broodstock is collected by mid August. Once the pink salmon broodstock is collected and contained behind the barrier net enclosure, additional commercial fishing time may be allowed inside Kitoi Bay depending on the progress of the cost recovery fishery (Figure 4). Fishing periods are coordinated between the Kitoi Bay Hatchery Manager and the Kodiak Area Management Biologist to ensure adequate broodstock, while maintaining an orderly cost recovery and commercial fishery. Escapement goals have not been formally established for Big Kitoi Creek; however, pink salmon escapement is monitored by KBH staff and about 15,000 pink salmon annually spawn in the creek (Table 5).

Chum Salmon

Chum salmon produced at KBH are taken in commercial purse seine fisheries in the Izhut, Duck and Kitoi Bay Sections (Figure 3). The chum salmon run begins in early June, peaks in late June to early July, and ends in early August (Figure 6). The initial chum salmon commercial opening in the Duck, Izhut, and Kitoi Bays Sections will occur on June 5 in 2004 (Brennan et al. 2004). In order to harvest adults in excess to hatchery broodstock needs, additional openings in these sections may occur as run strength is determined. Most of the chum salmon needed for broodstock (30,000; Table 5) are expected to be in the Inner Kitoi Bay Section by mid July (Figures 3 and 4). Broodstock are retained by a barrier net enclosure in Big Kitoi Bay (Figure 4). Once all chum salmon broodstock are contained behind the barrier net, additional commercial fishing time may occur inside Kitoi Bay. The chum salmon egg take is expected to occur from early July through early August.

The Hatchery Manager and the Kodiak Area Management Biologist will coordinate openings in the Duck, Izhut, and Kitoi Bay Sections to minimize the harvest of chum salmon during the June sockeye salmon and late July pink salmon fisheries. Escapement goals have not been formally established for Big Kitoi Creek; however, chum salmon escapement is monitored by KBH staff and about 2,000 chum salmon annually spawn in the creek (Table 5).

Coho Salmon

Coho salmon produced at KBH are harvested in commercial purse and beach seine fisheries and contribute to the catch in the Duck, Izhut, and Kitoi Bay Sections (Figure 3). The coho salmon run is expected to start in late July, peak in late August, and continue through the beginning of September (Figure 6). The majority of the coho will be harvested incidental to the pink salmon fishery in the Kitoi Bay area as well as in directed coho fisheries in late August and early September. Hatchery broodstock (10,000; Table 5) will be collected throughout the coho salmon run. In the past, a specific commercial fishing closure has not been necessary to ensure adequate broodstock. The run strength in 2004 is estimated to be substantially larger than broodstock requirements; therefore, specific commercial fishing closures are not expected to occur. Once all coho salmon broodstock are collected and contained behind the barrier net, an increase in commercial fishing time may occur inside Kitoi Bay.

There are three distinct areas where fishing is either prohibited year-round or restricted between August 15 and September 30 (Figures 3 and 4; 5 AAC 18.350; 5 AAC 64.022(b)). These closed waters areas are intended to improve broodstock collection efforts near the hatchery and are used as a precautionary measure to resolve potential conflicts between hatchery broodstock needs and subsistence and recreational fisheries. Broodstock are retained by a barrier net enclosure in the Big Kitoi Bay (Figure 4). In some years a substantial number of coho salmon broodstock are lost to marine mammal and bear predation (Hall et al. 1999; McCullough and Aro 2001).

Coho salmon returning to Jennifer and Ruth Lakes will also be harvested during commercial fisheries in Duck, Izhut and Kitoi Bay Sections (Figure 3). All of the coho salmon bound for these lakes will be available for harvest; brood fish are not required at Jennifer or Ruth Lakes since they are a part of a remote release program from KBH. Jennifer and Ruth Lakes have barrier falls that prevent salmon escapement into the lakes. Fish that are not harvested at Jennifer and Ruth Lakes have access to the lower portion of the outlet streams, so they are not expected to stray.

Coho salmon will be able to enter LKL beginning the first week of September to provide escapement (approximately 500 salmon; Table 5) and to prevent straying. Although the coho salmon peak run timing is slightly later than the pink salmon peak, most of the coho will be harvested during fisheries targeting pink salmon.

Sockeye Salmon

The sockeye salmon broodstock development program at LKL has evolved over the years using a mixture of stocks with different run timing (Hall et al. 1997, 1998, 1999; McCullough et al. 2000; McCullough and Aro 2001, 2002; Honnold and Aro 2003). Late-run Upper Station stock juveniles were initially stocked into LKL, but this stock was found to be inappropriate for broodstock development due to poor returns and late run timing (Honnold 1997). Consequently, egg takes at LKL were discontinued after 1996 and Sallery Lake sockeye salmon replaced the late-run Upper Station stock as the broodstock for the broodstock development program (Appendix F). A small number of Sallery Lake juveniles that were

stocked into LKL returned in 2003; however, the run was not large enough to enable broodstock collection at LKL. Thus, eggs were collected from Saltery Lake sockeye salmon in 2003 to continue broodstock development in 2004 (stocking of LKL).

The late sockeye salmon run should begin in late June and continue through mid August with the peak occurring during the first two weeks of July (Figure 7). The 2004 run (Saltery Lake stock) is forecast to be slightly larger than the 2003 run and may be sufficient for broodstock collection at LKL (Table 5). Closures inside the Kitoi Bay Harvest Section may occur to allow or protect LKL bound sockeye. All sockeye salmon returning to LKL in 2004 will be allowed to enter the lake for broodstock collection. The decision to conduct an egg take at LKL will be made by the middle of August. If escapement into LKL precludes an egg take, then Pillar Creek Hatchery personnel will collect the required number of eggs from Saltery Lake sockeye salmon as described in the Pillar Creek Hatchery Annual Management Plan (Table 5; Honnold and Byrne *in press*).

Crescent Lake

Coho Salmon

The purpose of the Crescent Lake coho salmon stocking project is to provide enhanced coho salmon for harvest as they return to Crescent Lake (Figure 5; 5 AAC 18.364). Most of the 2004 coho salmon run will be harvested in the local sport and subsistence fishery; however, a portion of the run may be available for commercial harvest. The commercial harvest of Crescent Lake coho salmon is expected to occur during normal fishing periods targeting coho salmon in the Northwest Kodiak District (Figure 2). Special openings are not expected to occur within the Settler Cove Terminal Harvest Area (Figure 5). Natural barriers prevent salmon access to Crescent Lake, so all returning coho salmon will be available for harvest. Fish that congregate in the outlet stream are prevented from straying since the villagers of Port Lions utilize the entire escapement for subsistence purposes. Harvest information will be monitored via the ADF&G subsistence permit and commercial fish ticket databases.

Katmai Lake

Coho Salmon

The purpose of the Katmai Lake coho salmon stocking project is to provide adult returns for harvest by sport and subsistence fishers in the vicinity of Ouzinkie Village (Figure 1). This project is also intended to provide students in Ouzinkie Village with a community and educational project assisting in the release of the presmolt. Most coho salmon returning to Katmai Lake will be harvested in the local sport and subsistence fishery. Some may also be harvested in commercial fisheries in the Northwest Kodiak District (Figure 2). Natural barriers prevent salmon access to Katmai Lake, so all returning coho salmon will be available for harvest (Table 5). Fish that congregate in the outlet stream are prevented from straying since the villagers

of Ouzinkie utilize the entire escapement for subsistence purposes. Harvest information will be monitored through subsistence permits issued to each fisher and commercial fish ticket data.

ADDITIONAL MEASURES FOR WILDSTOCK PROTECTION

Unplanned Cost Recovery Operational Plan (UCROP)

In 2002, large numbers of early-run sockeye salmon returned to the Foul Bay, Waterfall Bay, and Malina Creek THAs as a result of a lack of early season commercial fishing activity due to price disputes. The scheduled opening occurred on 9 June, but fishing did not commence until 16 June. The 2002 Pillar Creek Hatchery Management Plan (McCullough and Clevenger 2002) stated that ***“if large numbers of salmon return to enhancement sites prior to 9 June or if commercial fishing activities do not occur within 48 hours of the initial fishery opening, the Kodiak Area Management Biologist and the KRAA will implement a harvest strategy to reduce the risk of straying salmon. The harvest strategy will include the removal of barrier nets or weirs to allow the enhanced salmon free access to freshwater. When fishing activity commences the barrier net or weir will be re-installed. The KRAA will help administer any special harvest operations in a similar manner as was implemented for the Kitoi Bay special cost recovery project in 1989. In that instance, as many fish as possible were harvested in as short a period as feasible to maintain an orderly fishery.”*** The preceding plan was delayed due to KRAA and fishers concerns about the 48-hour deadline. The ADF&G reviewed the historical run timing of the Afognak Lake (broodstock for Hidden and Waterfall Lakes stocking) stock and determined that the removal of the barrier net and weir could be delayed until a specific harvest plan was ready to be implemented without increasing the risk of straying. However, since 50% of the Afognak Lake sockeye salmon run typically returns by 15 June, the ADF&G recommended that the barriers be removed no later than 15 June if fish were still returning and no later than 20 June if the runs declined. The fishery dispute was settled and fishing commenced on 16 June, alleviating the need to remove the barriers or conduct a special fishery.

The KRAA drafted an unplanned cost recovery operational plan (UCROP) for cost recovery fisheries in the THAs in 2003 (Honnold and Clevenger 2003). If commercial fishing does not occur for some reason in 2004, salmon returning to Kitoi Bay Hatchery will be harvested in the Kitoi Bay Special Harvest Area using the guidelines described in the UCROP.

Genetics Policy

The ADF&G Genetics policy, as described in the 2001 Kitoi Bay Hatchery AMP (McCullough and Aro 2001), will be followed in 2004 for all projects.

Policies and Guidelines for Health and Disease Control

The State of Alaska Pathology Review Committee policy (McGee 1995) as described in the 2001 Kitoi Bay Hatchery AMP (McCullough and Aro 2001) will be followed in 2004 for all projects.

EVALUATION

In FY 2003 the evaluation program and all the field operation responsibilities were transferred from ADF&G to Kodiak Regional Aquaculture Association personnel. The objectives of the evaluation program have essentially remained the same and include: 1) estimating the number of sockeye salmon smolts outmigrating from LKL (Appendix G), 2) estimating the survival of the sockeye salmon presmolt stocked into LKL, 3) estimating the average age, weight, and length (AWL) composition of the sockeye salmon smolts outmigrating from LKL, 4) collecting baseline age and growth data from sockeye presmolts and coho smolts reared at KBH, 5) monitoring salinity, temperature, and plankton bloom data in Kitoi Bay during saltwater rearing periods for juvenile pink, chum, and coho salmon, 6) estimating the age structure of chum salmon returning to the hatchery, and 7) estimating the zooplankton density and biomass in Little Kitoi, Jennifer, and Ruth Lakes (Schrof 2002).

Sockeye Salmon

The sockeye salmon evaluation program will continue to focus on assessing production from LKL presmolt releases. In 2004 we will rear and imprint 190,000 presmolts in net pens in LKL and non-volitionally release them during the peak outmigration of the resident sockeye. This release group will have 200 random scale samples collected both prior to transfer into the net pens and prior to non-volitional release. These presmolts should average about 20 g and should have significantly different scale patterns than the presmolts released into LKL in the fall. The latter, released from Pillar Creek Hatchery in 2004, will also be sampled for age data prior to release into LKL. The growth patterns from these scales will provide baseline data that will be used to identify stock (release lot) of origin when adults return to LKL.

Studies on the degree of imprinting and survival of sockeye salmon to LKL were implemented in 1997 (Hall et al. 1998). These studies will continue with an evaluation of age 1. sockeye presmolt releases. All sockeye salmon observed in Big Kitoi Creek and the hatchery raceways will be examined for marks and scales, and fish lengths will be taken. Scales taken from adults without marks will be aged and the scale patterns will be compared to LKL sockeye scale patterns. Any sockeye salmon found in the hatchery raceways will be killed, to prevent straying to other systems, and donated to charities.

The assessment of the sockeye salmon stocking strategy by age and or size at release was also part of the original evaluation program in conjunction with a straying study (Hall et al. 1999; Schrof et al. 2000). The intent of these studies was to determine which stocking strategy was the most successful, in terms of adult production.

In 2004 a portion of the sockeye salmon released (10% of the fall release into LKL) will again be marked prior to release by fin clipping to determine the success of a given rearing strategy. Returning adult sockeye salmon will be examined for fin clips and sampled at LKL fish ladder and during Kitoi Bay Section commercial salmon openings. Fish will also be examined at the LKL fish pass during sockeye escapement.

Limnology data will be collected in 2004 from Little Kitoi, Jennifer, and Ruth Lakes and salinity, temperature, and plankton data will be collected from Big and Little Kitoi Bays.

Chum, Coho, and Pink Salmon

In 2004 we will continue with the collection of chum salmon data (scales) throughout the run to develop a more complete and representative age class record. Age, length, and sex data will be collected from the escapement (600 adults) to Big Kitoi Creek and from the Kitoi Bay area commercial harvest (600 adults; McCullough and Aro 2002). These data will be used to assign ages to the adult chum salmon run and estimate overall survival by release year. Plankton tows will be conducted in Kitoi Bay to ascertain the timing of plankton blooms and to assess general ocean conditions prior to the release of pink and chum salmon fry. Prior to saltwater rearing, coho salmon smolts will be sampled for weight, length, and condition data and evaluated for their ability to osmoregulate (ability to maintain proper water and electrolyte balance in saltwater). The latter assessment will include holding small numbers of juveniles in the net pens used for rearing in saltwater and recording mortality. This will be repeated until mortality is minimal (<1%). Once this occurs, the remaining smolts will be transferred to the net pens for saltwater rearing.

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Table 1. Kitoi Bay Hatchery pink, chum, and coho salmon egg takes (Big Kitoi Creek broodstock) in 2002 and 2003, resultant juvenile releases planned for Big Kitoi Bay in 2004 and 2005, projected adult production, and fish transport permit information.

Parameter	Pink Salmon	Chum Salmon	Coho Salmon	Coho Salmon
Brood Year	2003	2003	2002	2003
<u>Egg take</u>				
eggs	183,845,988	27,605,144	1,322,745	1,197,330
adults	362,936	40,701	7,587	7,003
<u>Releases</u>				
location	Big Kitoi Bay	Big Kitoi Bay	Big Kitoi Bay	Big Kitoi Bay
number	145,000,000	21,000,000	965,000	1,000,000
size (g)	0.65	1.75	20.0	20.0
lifestage	fed fry	fed fry	smolt	smolt
date	24-May-04	24-May-04	31-May-04	01-Jun-05
<u>Projected Returns</u> ^a				
2005	7,902,500	0	168,875	0
2006	0	53,235	0	175,000
2007	0	307,125	0	0
2008	0	49,140	0	0
total	7,902,500	409,500	168,875	175,000
<u>Fish Transport Permit (FTP)</u>				
number	01A-0102	01A-0103	02A-0007	02A-0007
expires	30-Aug-06	31-Aug-06	01-May-12	01-May-12
max. no. eggs	215,000,000	25,000,000	1,300,000	1,300,000
max. no. juveniles	182,000,000 Fry	22,000,000 Fry	1,000,000 Smolt	1,000,000 Smolt

^a Projected returns are calculated from Table 2 survival and age assumptions.

Table 2. Salmon survival and age assumptions used to estimate returns for Kitoi Bay Hatchery.

Species	Year	Stocking		Survival ^a Stocking-to- adult return	Age-at-return Proportions ^a										
		Life Stage ^b	Size (g)		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	0.5	2.3
Pink	all	F	0.65	5.45%	1.00										
Chum	2004	F	1.75	1.95%		0.13		0.75			0.12				
	2005	F	2.25	4.00%		0.13		0.75			0.12				
Coho	all	FG	0.7	2.00%						1.00					
Coho	all	FPS	7.5	5.00%			1.00								
Coho	all	S	20	17.50%			1.00								
Sockeye	all	FPS	9	7.50%			0.01		0.31	0.01		0.39	0.24		0.05
Sockeye	all	SPS	20	17.50%			0.02		0.55			0.44			

^a Based on actual survival and age-at-return data from Kitoi Bay Hatchery and/or other ADF&G research projects; increased size of chum fry in 2005 expected to approximately double survival.

^b F = fry, FG = fingerling, FPS = fall presmolt, S = smolt, and SPS = spring presmolt.

Table 3. Kitoi Bay Hatchery coho salmon egg takes (Big Kitoi Creek broodstock) in 2003, resultant juvenile releases planned for Jennifer, Ruth, Crescent, and Katmai Lakes in 2004, projected adult production, and fish transport permit information.

Parameter	Coho Salmon	Coho Salmon	Coho Salmon	Coho Salmon
Brood Year	2003	2003	2003	2003
<u>Egg take</u>				
eggs	275,492	55,098	553,103	36,026
adults	1,611	322	3,235	211
<u>Stocking</u>				
location	Jennifer Lake	Ruth Lake	Crescent Lake	Katmai Lake
number	200,000	30,000	165,000	15,000
size (g)	0.7	0.7	0.7	7.5
lifestage	fingerling (FG)	fingerling (FG)	fingerling (FG)	presmolt (PS)
date	15-Jun-04	15-Jun-04	15-Jun-04	01-Oct-04
<u>Projected Returns</u>				
2006	0	0	0	750
2007	4,000	600	3,300	0
total	4,000	600	3,300	750
<u>Fish Transport</u>				
<u>Permit (FTP)</u>				
number	02A-0009	02A-0011	02A-0008	02A-0010
expires	01-May-12	01-May-12	15-May-12	01-May-12
max. no. eggs	300,000	60,000	600,000	40,000
max. no. juveniles	250,000 FG	50,000 FG	500,000 FG	30,000 PS

^a Projected returns are calculated from Table 2 survival and age assumptions.

Table 4. Pillar Creek Hatchery sockeye salmon egg takes (Saltery Lake broodstock) - egg transfer to Kitoi Bay Hatchery in 2002 and 2003, resultant juvenile releases planned for Little Kitoi Lake in 2004 and 2005, projected adult production, and fish transport permit information.

Parameter	Sockeye Salmon	Sockeye Salmon
Brood Year	2002	2003
<u>Egg take</u>		
eggs	200,000	432,197
adults	160	303
<u>Stocking</u>		
location	Little Kitoi Lake	Little Kitoi Lake
number	190,000	300,000
size (g)	20.00	20.00
lifestage	presmolt	presmolt
date	25-May-04	25-May-05
<u>Projected Returns</u> ^a		
2005	532	0
2006	18,121	840
2007	14,597	28,613
2008	0	23,048
total	33,250	52,500
<u>Fish Transport Permit (FTP)</u>		
number ^b	02A-0060	02A-0060
expires	01-Feb-05	01-Feb-05
max. no.	100,000	100,000
lifestage	Presmolt	Presmolt

^a Projected returns are calculated from Table 2 survival and age assumptions.

^b FTP 97A-0068 - for 1.2 million green eggs, expiring 31Dec-08, authorizes egg take for these projects; FTP 02A-0060 is in the process of being amended to provide for presmolt releases at the planned levels.

Table 5. Forecasted runs, broodstock requirements, minimum escapements, and projected harvest of salmon returning to systems in 2004 as a result of prior Kitoi Bay Hatchery stockings (rounded to thousands).

Return Location	Species	Forecasted Run			Broodstock Required	Minimum Escapement	Projected Harvest ^a
		Low	Point	High			
Kitoi Bay Hatchery	Pink	6,200,000	7,900,000	9,300,000	350,000	15,000 ^b	7,535,000
	Chum	331,000	423,000	551,000	30,000	2,000 ^b	391,000
	Coho	143,000	165,000	201,000	10,000	0	155,000
Little Kitoi Lake	Sockeye ^c	6,000	9,000	12,000	9,000	0	0
	Coho		500		0	500	0
Jennifer Lake	Coho		2,000		0	0	2,000
Ruth Lake	Coho		0		0	0	0
Crescent Lake	Coho	2,000	3,000	4,000	0	0	3,000
Katmai Creek	Coho		1,000		0	0	1,000
Saltery Lake ^d	Sockeye				4,000	15,000	

^a Point estimate of forecasted run minus broodstock and escapement needs.

^b Minimum escapement for Big Kitoi Creek refers to adults remaining in the creek after the hatchery has completed the egg-takes.

^c Egg take may occur in 2004 if sufficient adults (Saltery Lake broodstock) are counted through the fish pass into the lake. Eggs may be transferred to Pillar Creek Hatchery for stocking of Spiridon Lake in 2005. Broodstock numbers include 3,763 for Pillar Creek Hatchery and 538 for Kitoi Bay Hatchery for continued broodstock development (Little Kitoi Lake stocking). Assumption is that only 50% of Little Kitoi Lake escapement can be captured for broodstock (based on past seining efforts).

^d Saltery Lake egg take will occur if insufficient adults are available for a Little Kitoi egg take.

Table 6. Proposed 2004 Kitoi Bay Hatchery pink, chum, and coho salmon (including 2003) egg takes (Big Kitoi Creek broodstock), resultant juvenile releases planned for Big Kitoi Bay in 2005 and 2006, projected adult production, and fish transport permit information.

Parameter	Pink Salmon	Chum Salmon	Coho Salmon	Coho Salmon
Brood Year	2004	2004	2003	2004
<u>Egg take</u>				
eggs	190,000,000	25,000,000	1,197,330	1,200,000
adults	350,000	30,000	7,003	7,000
<u>Releases</u>				
location	Big Kitoi Bay	Big Kitoi Bay	Big Kitoi Bay	Big Kitoi Bay
number	139,000,000	21,000,000	1,000,000	1,000,000
size (g)	0.65	2.25	20.0	20.0
lifestage	fed fry	fed fry	smolt	smolt
date	24-May-05	24-May-05	31-May-05	01-Jun-06
<u>Projected Returns</u>				
2006	7,575,500	0	175,000	0
2007	0	109,200	0	175,000
2008	0	630,000	0	0
2009	0	100,800	0	0
total	7,575,500	840,000	175,000	175,000
<u>Fish Transport Permit (FTP)</u>				
number	01A-0102	01A-0103	02A-0007	02A-0007
expires	30-Aug-06	31-Aug-06	01-May-12	01-May-12
max. no. eggs	215,000,000	25,000,000	1,300,000	1,300,000
max. no. juveniles	182,000,000 Fry	22,000,000 Fry	1,000,000 Smolt	1,000,000 Smolt

^a Projected returns are actual calculations using Table 2 survival and age assumptions.

Table 7. Proposed 2004 Kitoi Bay Hatchery coho salmon egg takes (Big Kitoi Creek broodstock), resultant juvenile releases planned for Jennifer, Ruth, Crescent, and Katmai Lakes in 2005, projected adult production, and fish transport permit information.

Parameter	Coho Salmon	Coho Salmon	Coho Salmon	Coho Salmon
Brood Year	2004	2004	2004	2004
<u>Egg take</u>				
eggs	273,000	54,600	548,100	35,700
adults	780	156	1,566	102
<u>Stocking</u>				
location	Jennifer Lake	Ruth Lake	Crescent Lake	Katmai Lake
number	200,000	30,000	165,000	15,000
size (g)	0.7	0.7	0.7	7.5
lifestage	fingerling (FG)	fingerling (FG)	fingerling (FG)	presmolt (PS)
date	15-Jun-05	15-Jun-05	15-Jun-05	01-Oct-05
<u>Projected Returns</u>				
2006	0	0	0	0
2007	0	0	0	750
2008	4,000	600	3,300	0
2009	0	0	0	0
2010	0	0	0	0
total	4,000	600	3,300	750
<u>Fish Transport Permit (FTP)</u>				
number	02A-0009	02A-0011	02A-0008	02A-0010
expires	01-May-12	01-May-12	15-May-12	01-May-12
max. no. eggs	300,000	60,000	600,000	40,000
max. no. juveniles	250,000 FG	50,000 FG	500,000 FG	30,000 PS

^a Projected returns are calculated from Table 2 survival and age assumptions.

Table 8. Proposed Pillar Creek Hatchery sockeye salmon egg takes (Saltery Lake broodstock) - egg transfer to Kitoi Bay Hatchery in 2003 and 2004, resultant juvenile releases planned for Little Kitoi Lake in 2005 and 2006, projected adult production, and fish transport permit information.

Parameter	Sockeye Salmon	Sockeye Salmon	Sockeye Salmon
Brood Year	2003	2004	2004
<u>Egg take</u>			
eggs	432,197	161,290	645,161
adults	303	108	430
<u>Stocking</u>			
location	Little Kitoi Lake	Little Kitoi Lake	Little Kitoi Lake
number	300,000	100,000	400,000
size (g)	20.00	9.00	20.00
lifestage	presmolt	presmolt	presmolt
date	25-May-05	01-Oct-05	25-May-06
<u>Projected Returns</u> ^a			
2006	840	0	0
2007	28,613	38	1,120
2008	23,048	2,385	38,150
2009	0	4,665	30,730
2010	0	405	0
total	52,500	7,493	70,000
<u>Fish Transport Permit (FTP)</u> ^b			
number	02A-0060	02A-0060	02A-0060
expires	01-Feb-05	01-Feb-05	01-Feb-05
max. no.	100,000	100,000	100,000
lifestage	Presmolt	Presmolt	Presmolt

^a Projected returns are calculated from Table 2 survival and age assumptions.

^b FTP 97A-0068 - for 1.2 million green eggs, expiring 31 Dec-08, authorizes egg take for these projects; FTP 02A-0060 is in the process of being amended to provide for presmolt releases at the planned levels.

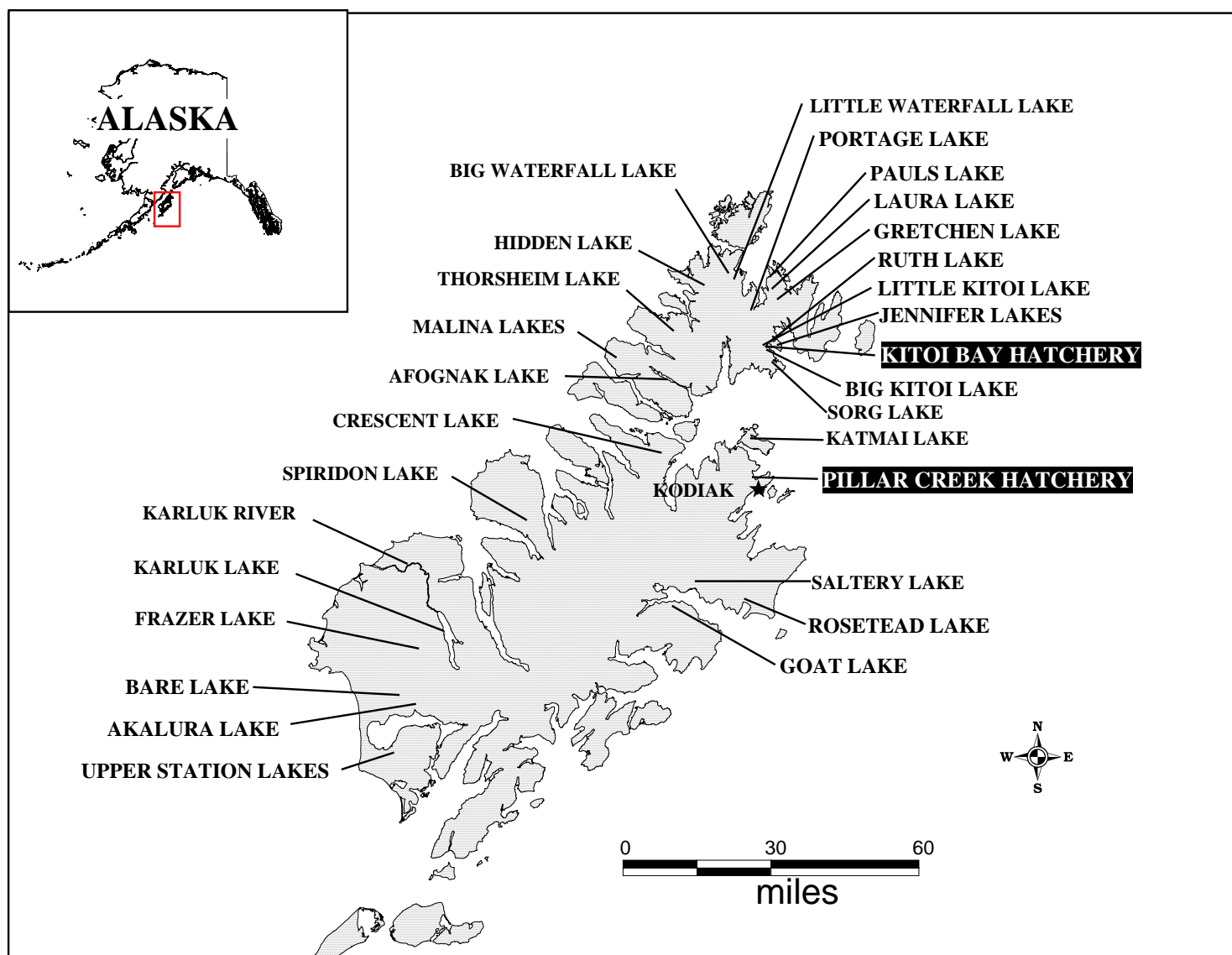


Figure 1. Locations of sockeye salmon enhancement and rehabilitation projects on Kodiak and Afognak Islands, 1951-2004.

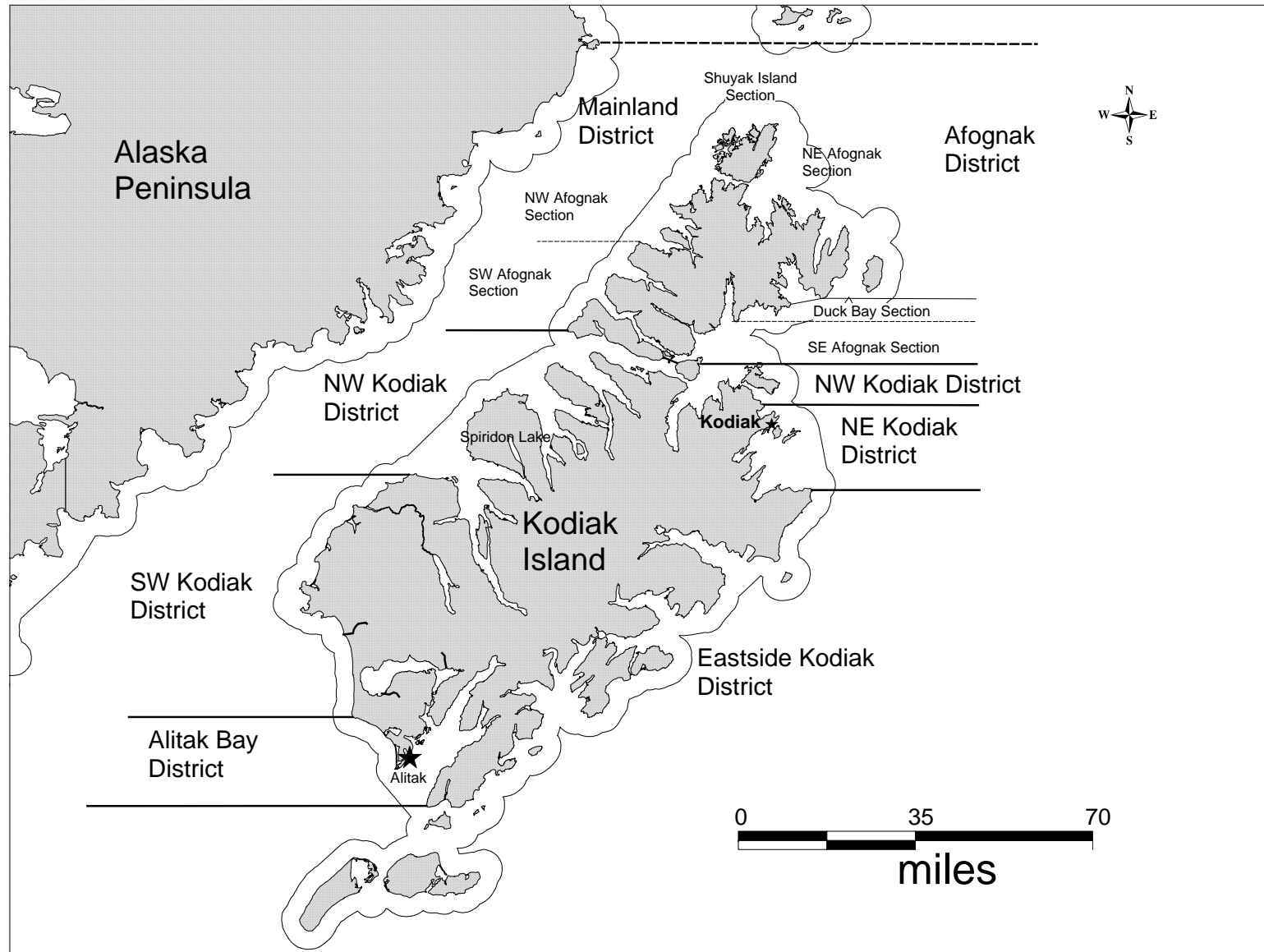


Figure 2. Map of the Kodiak Management Area depicting commercial fishing districts and selected sections.

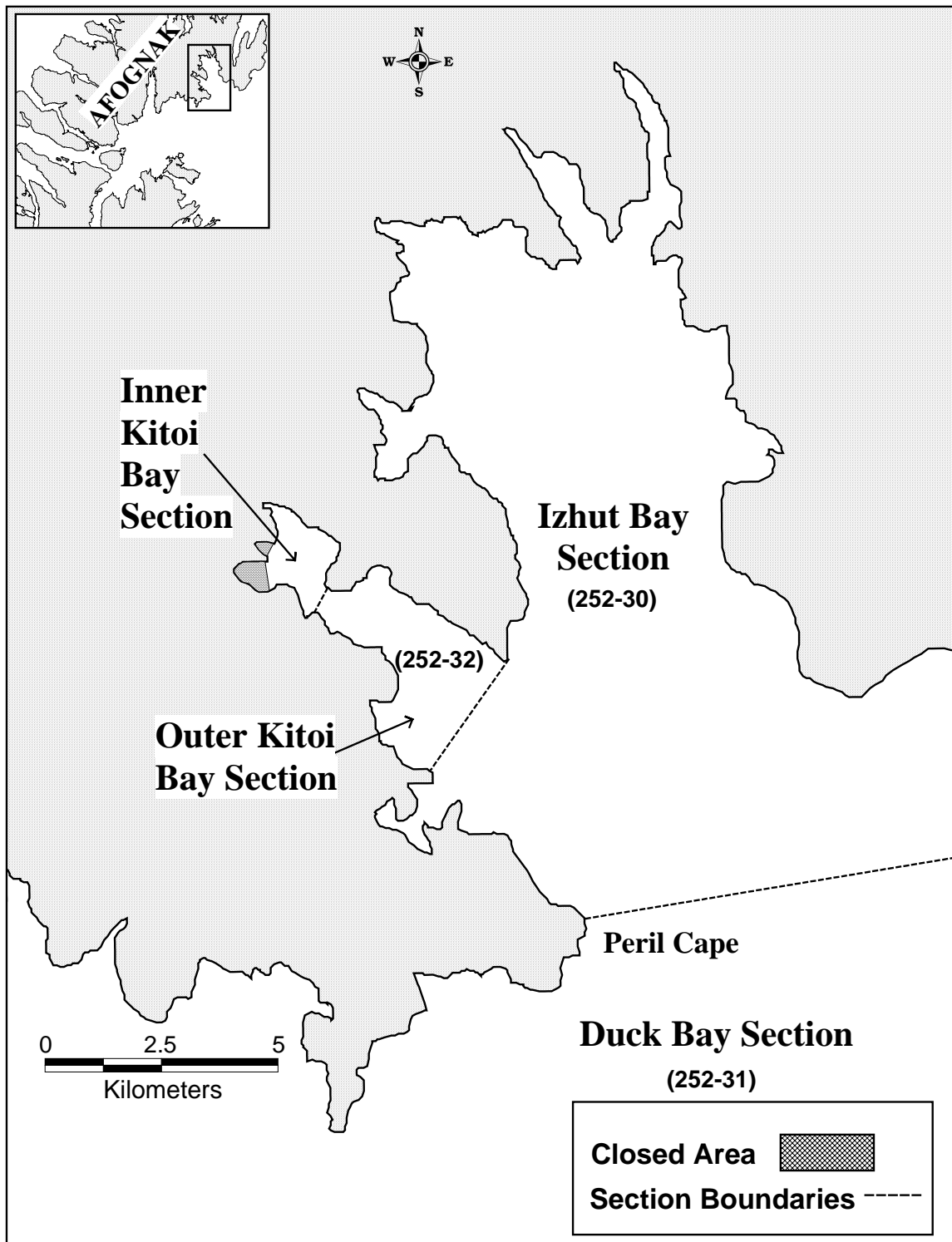


Figure 3. Map of Izhut (252-30), Duck (252-31), and Inner and Outer Kitoi Bay (252-32) Sections.

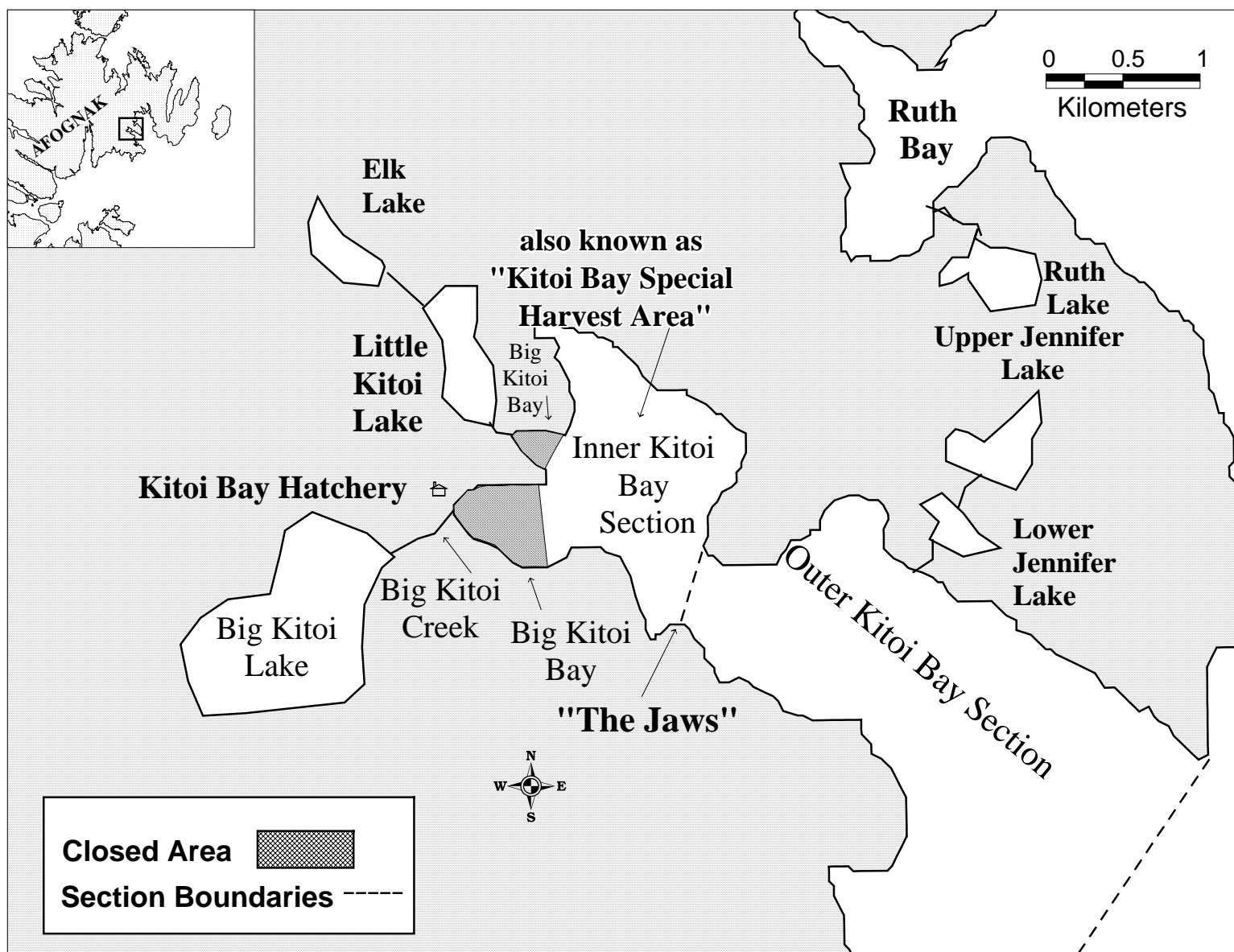


Figure 4. Map of Inner and Outer Kitoi Bay Sections (252-32).

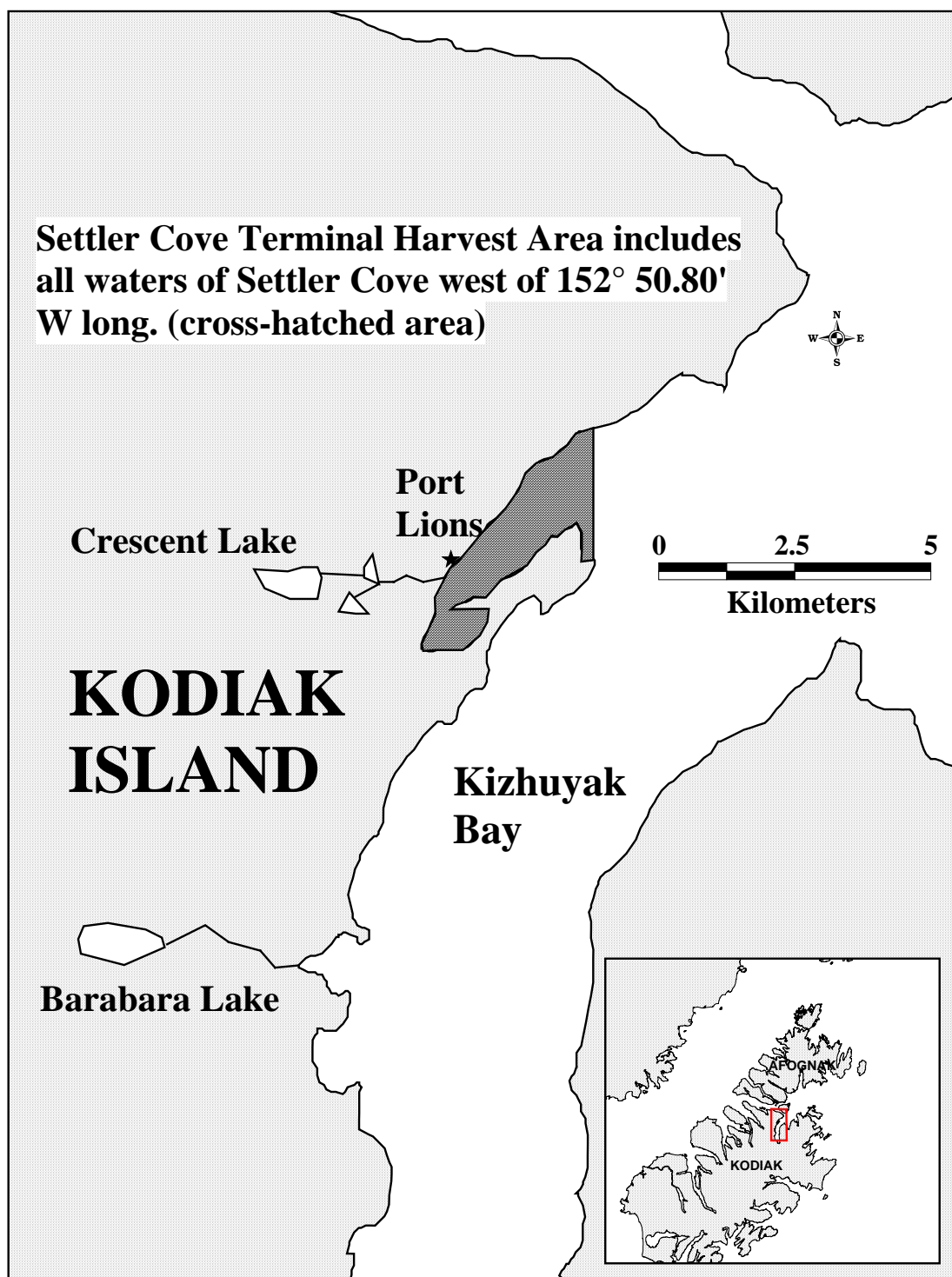


Figure 5. Settler Cove (Crescent Lake) terminal harvest area boundaries in Kizhuyak Bay.

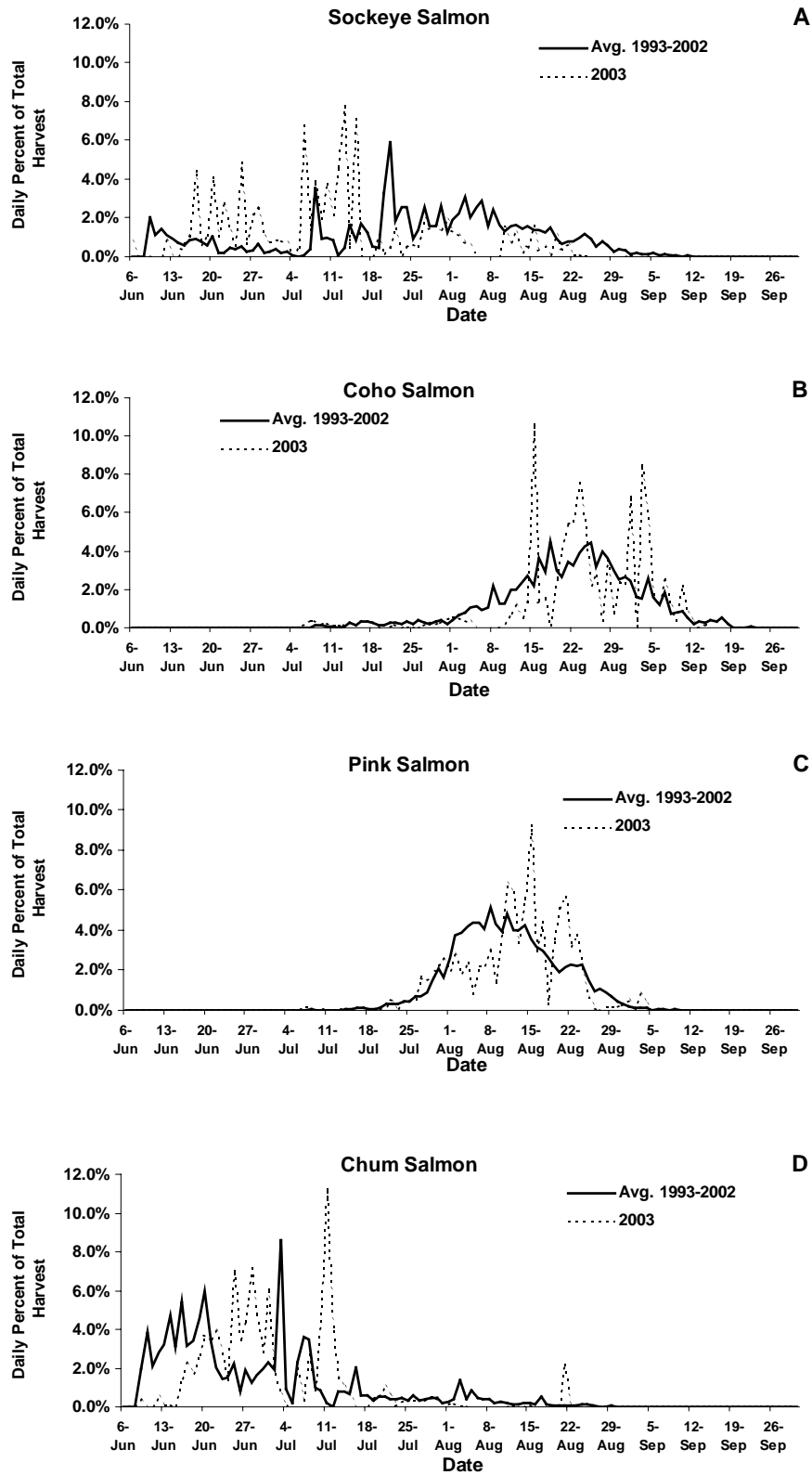


Figure 6. The average (1993-2002) timing compared to the 2003 timing of the harvests of sockeye (A), coho (B), pink (C), and chum (D) salmon in Kitoi Bay area (combined harvests in the Izhut, Duck, and Kitoi Sections).

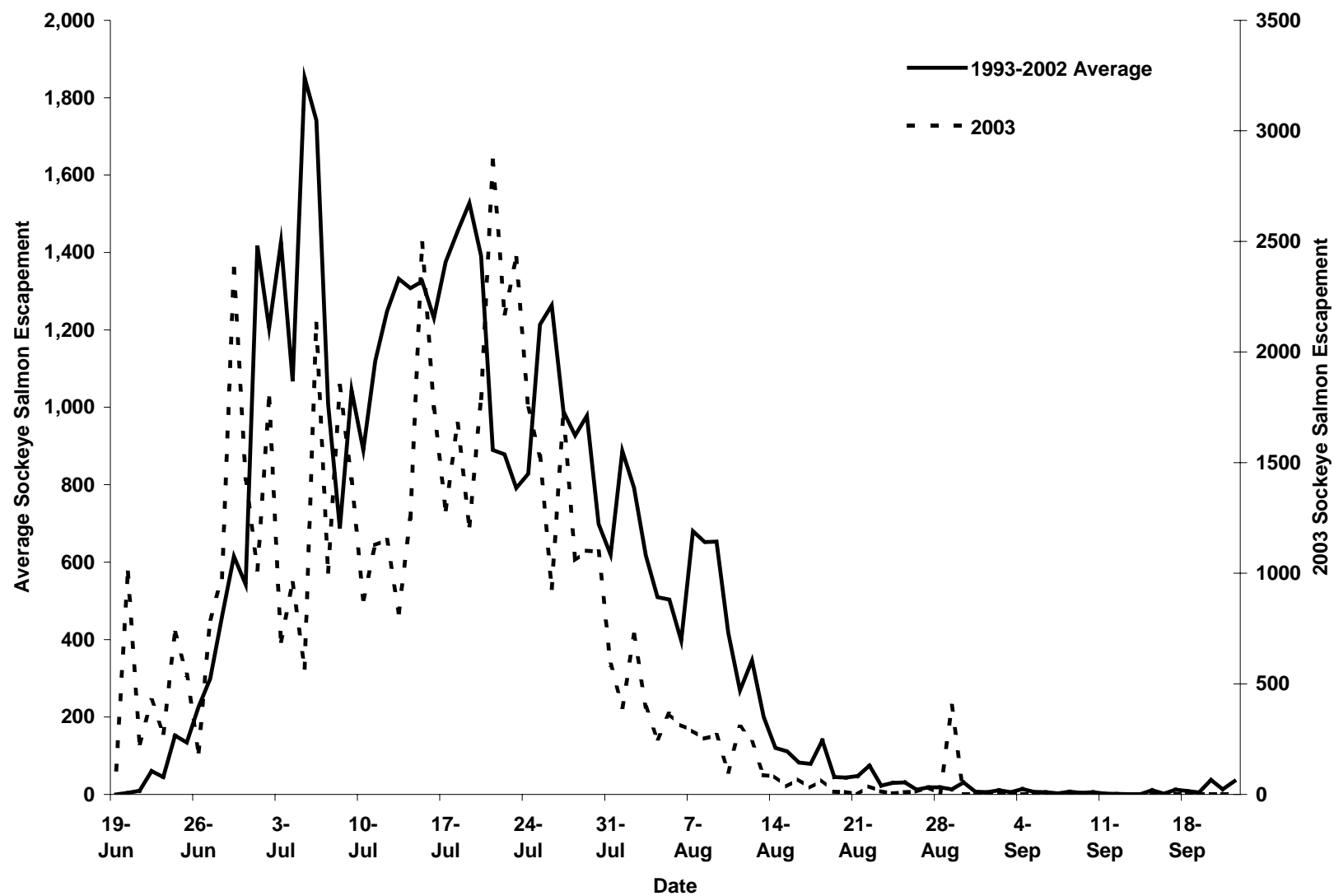


Figure 7. SALTERY LAKE sockeye salmon average escapement (1993-2002) compared to the 2003 escapement.

APPENDIX

Appendix A. Kitoi Bay Hatchery pink salmon release history, 1973-2003.

Brood	Pink Salmon Releases ^a		
	Year	Number	Avg. Weight (g)
1972	1973	493,130	
1973	1974	447,642	
1974	1975	1,226,314	
1975	1976	2,486,410	
1976	1977	4,722,152	0.50
1977	1978	17,255,424	0.44
1978	1979	17,319,537	
1979	1980	22,458,947	0.63
1980	1981	26,351,664	0.93
1981	1982	47,828,701	
1982	1983	72,054,096	0.79
1983	1984	87,065,569	0.58
1984	1985	75,109,442	0.29
1985	1986	97,773,052	0.78
1986	1987	90,017,823	0.27
1987	1988	94,172,516	0.73
1988	1989	80,502,220	0.62
1989	1990	84,907,550	0.61
1990	1991	124,148,019	0.60
1991	1992	147,145,130	0.80
1992	1993	169,552,112	0.51
1993	1994	163,192,575	0.45
1994	1995	134,104,406	0.53
1995	1996	144,045,245	0.48
1996	1997	102,583,724	0.50
1997	1998	128,101,460	0.50
1998	1999	127,685,500	0.54
1999	2000	137,702,154	0.61
2000	2001	134,823,670	0.72
2001	2002	152,990,900	0.56
2002	2003	144,823,895	0.86

^a Big Kitoi Creek broodstock; juveniles (fry lifestage) were released into Big Kitoi Bay net pens for rearing, then released into Big Kitoi Bay.

Appendix B. Kitoi Bay Hatchery chum salmon release history, 1982-2003.

Brood	Chum Salmon Releases ^a		
	Year	Number	Avg. Weight (g)
1981	1982	36,846	0.56
1982	1983	105,058	1.05
1983	1984	630,422	1.16
1984	1985	784,078	0.67
1985	1986	414,233	
1986	1987	693,166	2.00
1987	1988	4,737,587	2.10
1988	1989	3,289,878	1.85
1989	1990	1,502,501	2.44
1990	1991	0	
1991	1992	22,214,472	1.80
1992	1993	10,101,986	2.02
1993	1994	6,507,497	1.52
1994	1995	9,738,472	1.51
1995	1996	20,139,843	1.27
1996	1997	23,500,000	1.50
1997	1998	12,310,015	1.50
1998	1999	6,859,982	1.02
1999	2000	22,334,640	1.70
2000	2001	20,032,140	1.73
2001	2002	19,593,070	1.55
2002	2003	18,721,700	1.66

^a Big Kitoi Creek broodstock released into Big Kitoi Bay.

Appendix C. Kitoi Bay Hatchery coho salmon release history by location (active projects), 1983-2003.

Brood		Coho Salmon Releases				
		Year		Avg. Weight (g)	Life stage	Location
Year	Brood Stock	Year	Number	Weight (g)	Life stage	Location
1986	Little Kitoi Lake	1987	9,600	5.00	Presmolt	Big Kitoi Creek
1988	Little Kitoi Lake	1990	137,493	23.30	Smolt	Big Kitoi Bay
1990	Little Kitoi Lake	1992	60,755	32.00	Smolt	Big Kitoi Bay
1991	Little Kitoi Lake	1993	613,681	18.90	Smolt	Big Kitoi Bay
1992	Little Kitoi Lake	1993	5,163	14.60	Presmolt	Big Kitoi Creek
1992	Little Kitoi Lake	1994	97,973	28.40	Smolt	Big Kitoi Bay
1993	Big Kitoi Creek	1995	258,926	25.90	Smolt	Big Kitoi Bay
1994	Big Kitoi Creek	1996	894,486	23.54	Smolt	Big Kitoi Bay
1995	Big Kitoi Creek	1997	819,046	19.57	Smolt	Big Kitoi Bay
1996	Big Kitoi Creek	1998	769,000	23.90	Smolt	Big Kitoi Bay
1997	Big Kitoi Creek	1999	1,098,338	19.30	Smolt	Big Kitoi Bay
1998	Big Kitoi Creek	2000	871,448	16.92	Smolt	Big Kitoi Bay
1999	Big Kitoi Creek	2001	936,913	20.76	Smolt	Big Kitoi Bay
2000	Big Kitoi Creek	2002	1,041,342	16.90	Smolt	Big Kitoi Bay
2001	Big Kitoi Creek	2003	1,064,864	16.75	Smolt	Big Kitoi Bay
1987	Little Kitoi Lake	1988	241,373	1.13	Fingerling	Crescent Lake
1988	Little Kitoi Lake	1989	202,955	0.82	Fingerling	Crescent Lake
1990	Little Kitoi Lake	1991	191,416	1.10	Fingerling	Crescent Lake
1991	Little Kitoi Lake	1992	69,100	7.04	Presmolt	Crescent Lake
1992	Little Kitoi Lake	1993	68,420	14.60	Presmolt	Crescent Lake
1993	Big Kitoi Creek	1994	163,680	0.98	Fingerling	Crescent Lake
1994	Big Kitoi Creek	1995	167,778	1.16	Fingerling	Crescent Lake
1995	Big Kitoi Creek	1996	163,200	0.40	Fry	Crescent Lake
1996	Big Kitoi Creek	1997	165,000	0.35	Fry	Crescent Lake
1997	Big Kitoi Creek	1998	163,000	0.60	Fry	Crescent Lake
1998	Big Kitoi Creek	1999	165,000	0.57	Fry	Crescent Lake
1999	Big Kitoi Creek	2000	165,837	0.42	Fry	Crescent Lake
2000	Big Kitoi Creek	2001	165,000	0.90	Fry	Crescent Lake
2001	Big Kitoi Creek	2002	164,487	0.65	Fry	Crescent Lake
2002	Big Kitoi Creek	2003	164,395	0.63	Fry	Crescent Lake
1991	Little Kitoi Lake	1992	162,387	4.50	Fingerling	Jennifer Lakes
1992	Little Kitoi Lake	1993	135,486	1.94	Fingerling	Jennifer Lakes
1994	Big Kitoi Creek	1995	165,000	1.46	Fingerling	Jennifer Lakes
1996	Big Kitoi Creek	1997	163,000	0.35	Fry	Jennifer Lakes
1997	Big Kitoi Creek	1998	165,000	0.50	Fry	Jennifer Lakes
1998	Big Kitoi Creek	1999	136,000	0.55	Fry	Jennifer Lakes
1999	Big Kitoi Creek	2000	155,688	0.44	Fry	Jennifer Lakes
2000	Big Kitoi Creek	2001	120,000	0.86	Fry	Jennifer Lakes
2001	Big Kitoi Creek	2002	201,320	0.57	Fry	Jennifer Lakes
2002	Big Kitoi Creek	2003	197,590	0.57	Fry	Jennifer Lakes

-Continued-

Appendix C. (page 2 of 2)

Coho Salmon Releases						
Brood		Avg.				
Year	Brood Stock	Year	Number	Weight (g)	Life stage	Location
1986	Little Kitoi Lake	1987	22,349	0.50	Fingerling	Katmai Creek
1987	Little Kitoi Lake	1988	20,000	0.70	Fingerling	Katmai Creek
1991	Little Kitoi Lake	1992	14,973	8.00	Presmolt	Katmai Lake
1992	Little Kitoi Lake	1993	15,052	14.60	Presmolt	Katmai Lake
1993	Big Kitoi Creek	1994	13,178	23.28	Presmolt	Katmai Lake
1994	Big Kitoi Creek	1995	16,489	5.87	Presmolt	Katmai Lake
1995	Big Kitoi Creek	1996	15,246	5.04	Presmolt	Katmai Lake
1996	Big Kitoi Creek	1997	15,735	7.33	Presmolt	Katmai Lake
1998	Big Kitoi Creek	1999	15,000	8.23	Presmolt	Katmai Lake
1999	Big Kitoi Creek	2000	15,000	7.40	Presmolt	Katmai Lake
2000	Big Kitoi Creek	2001	15,000	8.37	Presmolt	Katmai Lake
2001	Big Kitoi Creek	2002	15,000	6.23	Presmolt	Katmai Lake
2002	Big Kitoi Creek	2003	15,000	7.38	Presmolt	Katmai Lake
1994	Big Kitoi Creek	1995	59,500	1.74	Fingerling	Ruth Lake
1996	Big Kitoi Creek	1997	35,000	0.35	Fry	Ruth Lake
1997	Big Kitoi Creek	1998	35,000	0.50	Fry	Ruth Lake
1998	Big Kitoi Creek	1999	35,000	0.57	Fry	Ruth Lake
1999	Big Kitoi Creek	2000	30,695	0.72	Fry	Ruth Lake
2001	Big Kitoi Creek	2002	30,000	0.69	Fry	Ruth Lake
2002	Big Kitoi Creek	2003	30,000	0.63	Fry	Ruth Lake

Appendix D. Kitoi Bay Hatchery coho salmon release history by location (non-active), 1983-1995.

Brood Year	Brood Stock	Coho Salmon Releases				
		Year	Number	Avg. Weight (g)	Life stage	Location ^a
1982	Buskin	1983	77,348	0.85	Fingerling	Buskin Lake
1983	Buskin	1984	43,288	0.64	Fingerling	Buskin Lake
1984	Buskin	1985	45,645	1.88	Fingerling	Buskin Lake
1985	Buskin	1986	50,024	0.79	Fingerling	Buskin Lake
1994	Big Kitoi Creek	1995	59,030	2.50	Fingerling	Elk Lake
1994	Big Kitoi Creek	1995	28,350	2.41	Fingerling	Finger Lake
1987	Little Kitoi Lake	1988	137,585	1.13	Fingerling	Hidden Lake
1988	Little Kitoi Lake	1989	239,817	0.85	Fingerling	Hidden Lake
1990	Little Kitoi Lake	1991	250,889	1.25	Fingerling	Hidden Lake
1983	Little Kitoi Lake	1984	131,825	0.96	Fingerling	Kodiak Road System ^a
1984	Little Kitoi Lake	1985	109,568	0.90	Fingerling	Kodiak Road System ^a
1984	Little Kitoi Lake	1985	12,731	2.60	Fingerling	Kodiak Road System ^a
1985	Little Kitoi Lake	1986	141,750	1.08	Fingerling	Kodiak Road System ^a
1986	Little Kitoi Lake	1987	103,824	1.03	Fingerling	Kodiak Road System ^a
1987	Little Kitoi Lake	1988	84,600	1.18	Fingerling	Kodiak Road System ^a
1988	Little Kitoi Lake	1989	87,585	0.80	Fingerling	Kodiak Road System ^a
1989	Little Kitoi Lake	1990	36,040	1.75	Fingerling	Kodiak Road System ^a
1990	Little Kitoi Lake	1991	83,530	1.24	Fingerling	Kodiak Road System ^a
1991	Little Kitoi Lake	1992	51,500	1.60	Fingerling	Kodiak Road System ^a
1991	Little Kitoi Lake	1992	15,200	8.00	Presmolt	Kodiak Road System ^a
1992	Little Kitoi Lake	1993	64,000	1.76	Fingerling	Kodiak Road System ^a
1983	Little Kitoi Lake	1984	127,700	1.00	Fingerling	Little Kitoi Lake
1984	Little Kitoi Lake	1985	33,472	1.50	Fingerling	Little Kitoi Lake
1985	Little Kitoi Lake	1986	53,360	6.10	Presmolt	Little Kitoi Lake
1986	Little Kitoi Lake	1987	171,103	1.79	Fingerling	Little Kitoi Lake
1987	Little Kitoi Lake	1988	43,807	1.52	Fingerling	Little Kitoi Lake
1991	Little Kitoi Lake	1992	70,605	1.40	Fingerling	Little Kitoi Lake
1992	Little Kitoi Lake	1993	139,147	1.30	Fingerling	Little Kitoi Lake
1983	Little Kitoi Lake	1984	5,000	2.54	Fingerling	Shemya

^a Kodiak Road System refers to lakes adjacent to maintained roads accessible from the City of Kodiak.

Appendix E. Kitoi Bay Hatchery sockeye salmon release history, 1989-2003.

Brood		Sockeye Salmon Releases				
Year	Brood Stock	Year	Number	Size (g)	Life stage	Location
1988	Upper Station	1989	143,725	2.48	Zero Check Smolt	Little Kitoi Bay
1989	Upper Station	1990	249,346	0.20	Fry	Spiridon
		1990	241,000	0.50	Fingerling	Little Kitoi Lake
		1990	337,932	0.18	Fry	Little Kitoi Lake
		1990	854,610	3.23	Zero Check Smolt	Little Kitoi Bay
		1990	458,118	0.48	Zero Check Fingerling	Little Kitoi Bay
1990	Upper Station	1991	1,250,000	2.50	Zero Check Smolt	Little Kitoi Bay
1991	Upper Station	1992	1,463,000	1.60	Zero Check Smolt	Little Kitoi Bay
1992	Upper Station	1993	52,418	3.13	Presmolt	Little Kitoi Lake
		1993	180,000	0.50	Fingerling	Jennifer Lakes
		1994	326,500	15.00	Smolt	Little Kitoi Bay
1993	Upper Station	1994	1,672,710	1.11	Zero Check Smolt	Little Kitoi Bay
	Little Kitoi Lake	1994	10,108	4.60	Presmolt	Little Kitoi Lake
		1995	916,677	10.08	Smolt	Little Kitoi Bay
1994	Upper Station	1995	266,952	1.83	Zero Check Smolt	Little Kitoi Lake
	Little Kitoi Lake	1995	84,861	4.98	Presmolt	Little Kitoi Lake
		1996	573,242	12.70	Smolt	Little Kitoi Bay
1995	Little Kitoi Lake	1996	155,687	3.16	Presmolt	Little Kitoi Lake
	Upper Station	1997	587,435	12.10	Smolt	Little Kitoi Bay
1996	Little Kitoi Lake	1997	77,039	3.31	Presmolt	Little Kitoi Lake
	Little Kitoi Lake	1997	99,085	11.70	Presmolt	Little Kitoi Lake
	Little Kitoi Lake	1998	397,000	15.10	Smolt	Little Kitoi Bay
1997	Saltery Lake	1999	106,658	17.70	Smolt	Little Kitoi Lake
1998	Saltery Lake	1999	98,737	7.00	Fingerling	Little Kitoi Lake
		1999	74,463	14.63	Presmolt	Little Kitoi Lake
		1999	23,756	14.35	Presmolt	Little Kitoi Bay ^a
1999	Saltery Lake	2000	154,039	11.31	Presmolt	Little Kitoi Lake
2000	Saltery Lake	2001	282,089	9.53	Presmolt	Little Kitoi Lake
2001	Saltery Lake	2002	212,418	6.55	Presmolt	Little Kitoi Lake
2002	Saltery Lake	2003	102,822	8.75	Presmolt	Little Kitoi Lake

^a This release resulted from a dissolved oxygen crash in the transfer tank.

Appendix F. Little Kitoi Lake sockeye salmon egg takes, and eggs incubated and reared at Kitoi Bay Hatchery, 1993-1996 brood years.

Brood Year	Number Adults	Eggs (millions)	Number Released	Year Stocked	Life Stage	Stocking Location
1993	1,050	1.10	10,108	1994	Presmolt	Little Kitoi Lake
			916,677	1995	Smolt	Little Kitoi Bay
1994	600	1.50	84,861	1995	Presmolt	Little Kitoi Lake
			573,242	1996	Smolt	Little Kitoi Bay
1995	155	0.19	155,687	1996	Presmolt	Little Kitoi Lake
1996	1,210	1.20	77,039	1997	Presmolt	Little Kitoi Lake
			99,085	1997	Presmolt	Little Kitoi Lake
			397,000	1998	Smolt	Little Kitoi Bay

Appendix G. The estimated number of juveniles by species caught in the smolt trap at the outlet of Little Kitoi Lake, 2003.

Day	Sockeye		Coho			Pink fry		Dolly Varden		Steelhead		Sticklebacks		Trap Catch	
	Daily	Cum. ^a	smolt	fry	Cum. ^a	Daily	Cum. ^a	Daily	Cum. ^a	Daily	Cum. ^a	Daily	Cum. ^a	Daily	Cum. ^a
28-Apr	0	0													
29-Apr	14	14													14
30-Apr		14													14
1-May		14													14
2-May		14													14
3-May		14													14
4-May	93	107												93	107
5-May	96	203	1	1	2	0	0	0	0	0	0	3	3	101	208
6-May	81	284	5	1	8	2	2	0	0	0	0	0	3	89	297
7-May	0	284	0	0	8	0	2	0	0	0	0	0	3	0	297
8-May	0	284	0	0	8	0	2	0	0	0	0	0	3	0	297
9-May	0	284	0	0	8	0	2	0	0	0	0	0	3	0	297
10-May	0	284	0	0	8	0	2	0	0	0	0	0	3	0	297
11-May	194	478	1	0	9	0	2	3	3	0	0	2	5	200	497
12-May	0	478	0	0	9	0	2	0	3	0	0	0	5	0	497
13-May	113	591	2	0	11	0	2	0	3	0	0	0	5	115	612
14-May	0	591	0	0	11	0	2	0	3	0	0	0	5	0	612
15-May	689	1,280	15	0	26	0	2	0	3	0	0	0	5	704	1,316
16-May	0	1,280	0	0	26	0	2	0	3	0	0	0	5	0	1,316
17-May	313	1,593	14	3	43	0	2	0	3	0	0	3	8	333	1,649
18-May	1,186	2,779	39	0	82	0	2	1	4	0	0	0	8	1,226	2,875
19-May	766	3,545	146	0	228	0	2	0	4	0	0	0	8	912	3,787
20-May	93	3,638	26	0	254	0	2	2	6	0	0	0	8	121	3,908
21-May	181	3,819	55	0	309	0	2	1	7	0	0	0	8	237	4,145
22-May	1,141	4,960	151	0	460	0	2	1	8	0	0	0	8	1,293	5,438
23-May	698	5,658	49	0	509	0	2	0	8	0	0	3	11	750	6,188
24-May	0	5,658	0	0	509	0	2	0	8	0	0	0	11	0	6,188
25-May	106	5,764	7	0	516	0	2	0	8	0	0	1	12	114	6,302
26-May	2,312	8,076	451	0	967	0	2	5	13	0	0	0	12	2,768	9,070
27-May	1,913	9,989	360	0	1,327	0	2	0	13	0	0	0	12	2,273	11,343
28-May	564	10,553	106	0	1,433	0	2	5	18	0	0	0	12	675	12,018
29-May	11,175	21,728	926	0	2,359	0	2	0	18	0	0	0	12	12,101	24,119
30-May	2,231	23,959	299	0	2,658	0	2	0	18	0	0	0	12	2,530	26,649
31-May	384	24,343	195	0	2,853	0	2	0	18	0	0	0	12	579	27,228

-Continued-

Appendix G. (page 2 of 2)

Day	Sockeye		Coho			Pink fry		Dolly Varden		Steelhead		Sticklebacks		Trap Catch	
	Daily	Cum. ^a	smolt	fry	Cum. ^a	Daily	Cum. ^a	Daily	Cum. ^a	Daily	Cum. ^a	Daily	Cum. ^a	Daily	Cum. ^a
1-Jun	48	24,391	95	0	2,948	0	2	14	32	1	1	0	12	158	27,386
2-Jun	1,755	26,146	175	0	3,123	0	2	5	37	0	1	0	12	1,935	29,321
3-Jun	4,948	31,094	321	0	3,444	0	2	0	37	0	1	0	12	5,269	34,590
4-Jun	632	31,726	159	0	3,603	0	2	3	40	0	1	0	12	794	35,384
5-Jun	678	32,404	395	0	3,998	0	2	0	40	0	1	0	12	1,073	36,457
6-Jun	1,189	33,593	305	0	4,303	0	2	0	40	1	2	0	12	1,495	37,952
7-Jun	0	33,593	0	0	4,303	0	2	0	40	0	2	0	12	0	37,952
8-Jun	3,210	36,803	167	0	4,470	0	2	1	41	0	2	0	12	3,378	41,330
9-Jun	0	36,803	0	0	4,470	0	2	0	41	0	2	0	12	0	41,330
10-Jun	313	37,116	143	0	4,613	0	2	1	42	0	2	0	12	457	41,787
11-Jun	3,026	40,142	255	0	4,868	0	2	8	50	0	2	0	12	3,289	45,076
12-Jun	6,599	46,741	369	0	5,237	0	2	17	67	8	10	0	12	6,993	52,069
13-Jun	1,056	47,797	78	0	5,315	0	2	5	72	0	10	0	12	1,139	53,208
14-Jun	1,189	48,986	96	0	5,411	0	2	11	83	0	10	0	12	1,296	54,504
15-Jun	1,032	50,018	61	0	5,472	0	2	0	83	0	10	0	12	1,093	55,597
16-Jun	416	50,434	62	0	5,534	0	2	3	86	5	15	0	12	486	56,083
17-Jun	1,518	51,952	80	0	5,614	0	2	1	87	2	17	0	12	1,601	57,684
18-Jun	0	51,952	0	0	5,614	0	2	0	87	0	17	0	12	0	57,684
19-Jun	202	52,154	16	0	5,630	0	2	2	89	6	23	0	12	226	57,910
20-Jun	1,155	53,309	74	0	5,704	0	2	7	96	1	24	7	19	1,244	59,154
21-Jun	1,701	55,010	99	0	5,803	0	2	5	101	3	27	0	19	1,808	60,962
22-Jun	364	55,374	31	0	5,834	0	2	0	101	1	28	0	19	396	61,358
23-Jun	350	55,724	15	0	5,849	0	2	1	102	1	29	0	19	367	61,725
24-Jun	680	56,404	54	0	5,903	0	2	0	102	0	29	0	19	734	62,459
25-Jun	70	56,474	40	0	5,943	0	2	1	103	0	29	0	19	111	62,570
26-Jun	0	56,474	0	0	5,943	0	2	0	103	0	29	0	19	0	62,570
27-Jun	0	56,474	0	0	5,943	0	2	0	103	0	29	0	19	0	62,570
28-Jun	3,067	59,541	177	0	6,120	0	2	1	104	6	35	0	19	3,251	65,821
29-Jun	284	59,825	16	0	6,136	0	2	0	104	6	41	0	19	306	66,127
30-Jun	60	59,885	10	0	6,146	0	2	0	104	2	43	0	19	72	66,199
1-Jul		59,885			6,146		2		104		43		19	0	66,199
2-Jul		59,885			6,146		2		104		43		19	0	66,199

^a cum. = cumulative count.

SIGN-OFF

_____ Andrew Aro: Kitoi Bay Hatchery Manager, KRAA	_____ Date
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_____ Steve Honnold: Regional Resource Development Biologist, CFD	_____ Date
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_____ Jim McCullough: Regional Finfish Management Supervisor, CFD	_____ Date
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_____ Patti Nelson: Regional Finfish Research Supervisor, CFD	_____ Date
--	---------------

_____ Kevin Brennan: Area Finfish Management Biologist, CFD	_____ Date
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_____ Denby Lloyd: Regional Supervisor, CFD	_____ Date
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_____ Len Schwarz: Area Biologist, SFD	_____ Date
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_____ Barry Stratton: Regional Supervisor, SFD	_____ Date
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_____ Larry Malloy: Executive Director, KRAA	_____ Date
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The 2004 Hatchery Management Plan for KBH is hereby approved:

_____ Kevin Duffy: Commissioner, ADF&G	_____ Date
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